

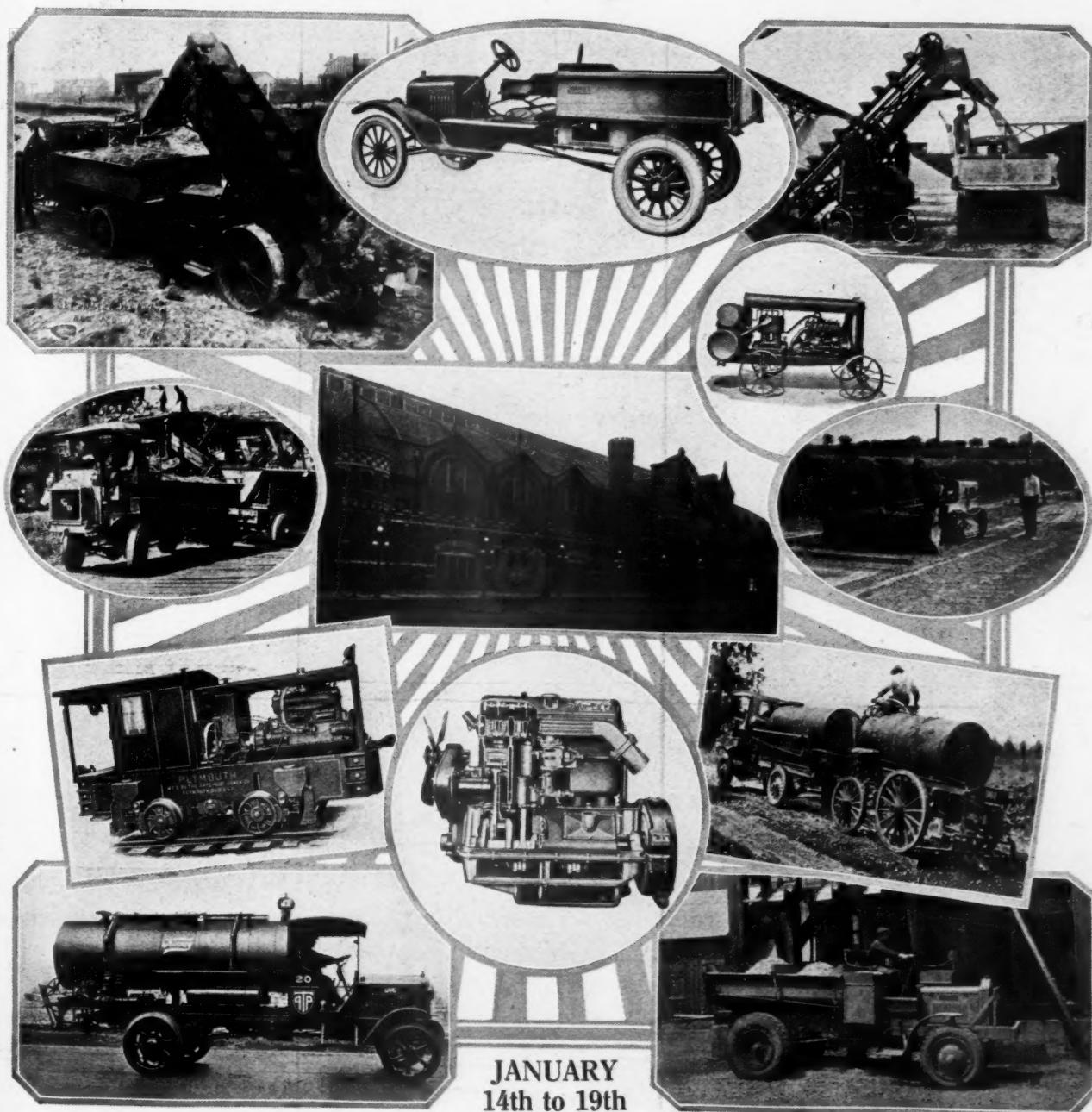
# *The Commercial Car Journal*

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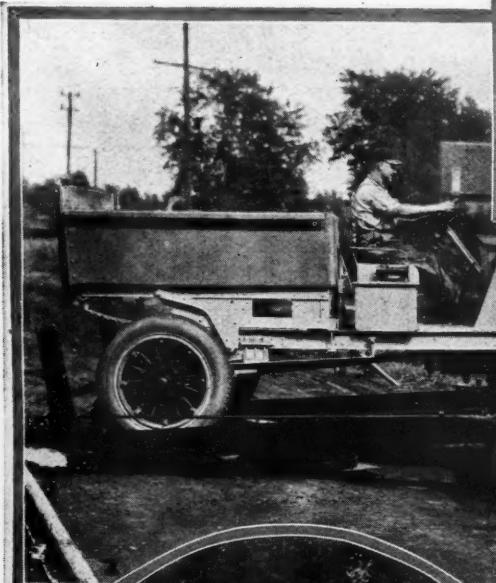
## WHAT YOU WILL SEE



JANUARY  
14th to 19th

*at the GOOD ROADS SHOW*

# Dump Bodies Will be Featured at the Good Roads Show



1. GMC Model K-41 With Wood Underbody Hoist and Body.
2. Hug Speed Job and Hug Turntable. A New Model for 1924 Will be Announced at the Show.
3. The F W D Road Builder, Which is Practically a Power Wagon and Sometimes Used as a Fifth Wheel.
4. The Oshkosh 4-Wheel Drive Road Builder. A New 3½ Yard Model Will be Featured at the Show.
5. The GMC Model K-16, Equipped With Lee Gravity Type Dump Body.
6. The O'Connell Two-Way Drive Truck. Five Speeds in Either Direction.

# The 1924 Good Roads Show

**Largest Exhibition of Motorized Road Building Machinery Ever. American Road Builders' Association Will Stage It at Chicago Next Month**

By ALBERT G. METZ

WHEN the doors of the Coliseum at Chicago are officially opened at 8 p. m., January 14th, 1924, on the Good Roads Show, the visitor will look upon a spectacle with which the average American citizen is unfamiliar. For the Good Roads Show cannot be classed in the same category with the popular types of exhibition, as for instance, food shows, household appliance shows, electrical shows, automobile shows, etc. When you enter the Coliseum, your eyes will not rest upon a line of prettily decorated booths with neat white railings and upholstered chairs that welcome you to a chat with some attendant at the booth, or to help ornament the exhibit. Neither will the strains of the "jazz" orchestra fall upon your ears to help you get the proper stride to saunter among the exhibits.

Oh yes! They have music at this show, but the brass band has to do some blowing to make itself heard above the clanking of the bucket elevators and whirring of the machinery that will be in operation. You look skyward to see the booms of huge power shovels and excavators, crowding the horizon. You will wonder if the show is ALL SET or whether they are still putting the exhibits in place. And then as you wend your way among the exhibits, you will realize that you are in the midst of one of the greatest exhibitions of its kind ever put on. You will begin to appreciate what road building really means. On all sides you will see machinery and more machinery. Down the center aisle you will see some of the largest shovels, ditch diggers and loaders in existence. The thing awes you, it's so different from the average show. If you are an automotive man—a motor truck dealer, perhaps—you will be curious to see what automotive products are exhibited. And here they are: Motor trucks, dump bodies, hoists, trailers winches, loaders, small concrete mixers, and other apparatus, all of which are dependent on the gasoline motor for their operation. After that, you will begin to feel at home. But the numerous applications of the gasoline engine will surprise you.

And when you pass through the archway to the adjoining Greer Building, you will see more trucks, trailers and tractors and gasoline-powered apparatus. There are more exhibits on the balcony and in the ballroom. Once on the balcony you will stop and gaze down for some time upon a scene which time cannot efface from memory. You will watch the smooth, easy motion of the clamshell bucket as it swings aloft. You will watch the huge scoops of the large concrete mixers move upward and you mentally picture a whole truck load of cement, sand and stone, sliding down the throat of the mixer. The noise and bustle and activity of the scene below will make you realize that the road building business is something of

tremendous proportions. It is a real business show.

Such is the impression you get when you first step into the Good Roads Show. And then, when you consider that there are about two hundred and thirty exhibits in the place you will make up your mind that it will take you several days to really see the show. You will appreciate the fact that only through the use of motor trucks and power-operated machinery is it possible to carry on the big road building program that this country is undertaking. Furthermore, when you figure that during the week approximately 10,000 contractors from all sections of the country will have seen that show, you cannot help but reflect upon the opportunities you are missing in not getting into a little closer relationship with road building operations. The Good Roads Show will bring home to you the magnitude of the building progress that is going on in this country.

You will find that the road building contractor is looking for real honest-to-goodness truck and machinery that will speed up his work. The truck in road buildings must be sturdily built, must stand an unusual amount of rough handling, must have speed and at the same time adequate power to pull through the worst kind of roads. It must be properly tired so as not to cut through the sub-base; the dump bodies must have the proper angle of lift so that the wet concrete mix will run out clean; the wheelbase must be short so that the trucks can be turned around in the shortest space and with the minimum loss of time, and so on. Road building has its peculiar problems and it will pay the dealer to study closely the road builders' requirements, as that is the only way he can obtain and hold his confidence. The contractor is always looking for the equipment that will save him money, and the experienced contractor is not looking for cheap material unless it is reliable. The truck that will stand the gaff is the one best suited for his work, as delays many times spell the difference between profit and loss.

One billion dollars or more will be spent during 1924 in the construction of 40,000 miles of improved surface roads. It will take lots of machinery to complete that mileage and this means that contractors all over the country will need new equipment—in some sections more than in others.

Although road building has become one of the leading activities of the country, it is only in its infancy. In a recent statement, Thomas H. MacDonald, Chief of the U. S. Bureau of Public Roads, said: "Highway building should be continued as fast as the physical limitations of labor and material will permit. The longer the job is delayed, the greater will be the ultimate cost to the people. The reason is that the

traffic on the main roads has now become so heavy that the excessive cost of operating motor vehicles over bad roads outweighs the cost of constructing good ones."

The tremendous amount of maintenance work that is being carried on each year, particularly in such states where the building of good surface roads has not started in real earnest, should not be lost sight of. The market for road scrapers, drags, trucks and tractors, for this work is increasing steadily and will continue to increase with the universal demand of good roads.

The following pages should give the reader a comprehensive idea of the variety of products, which will be shown at the Good Roads Show. A careful perusal of these pages will show that the gasoline engine plays the leading role in the road building machinery field.

#### THE GOVERNMENT EXHIBIT AT THE GOOD ROADS SHOW

The exhibit of the U. S. Bureau of Public Roads will be one of the outstanding displays of the show. The exhibit will consist of the following material:

1. A large composition model and painting exhibited at the International Exhibition held last year at Rio de Janeiro, Brazil. This model has attracted a great deal of attention since, as the method of combining a painting and model is something new and unique in the way of exhibits. In the foreground is shown the construction of a gravel road with a gravel plant nearby, the gravel plane and road roller being in continuous operation. The background is a painting showing a typical American rural scene which merges into the model work of the foreground in such a manner that it is difficult to tell where the painting ends and the model begins when viewed from some distance.

2. A collection of painted transparencies which will be illuminated, illustrating Federal-aid and forest road construction in all sections of the country.

3. Small booths illustrating various activities of the Bureau in the line of physical research relating to road building and economic surveys.

4. A collection of small road models illustrating methods of construction of various types of road. These models have been prepared for use in engineering schools and colleges, but will be of interest to practical road builders. Perhaps the most interesting model of this collection will be the concrete road construction model recently completed which shows every man and every detail of an up-to-date road construction job with faithful exactness.

5. To exhibit the motion pictures illustrating road construction the Bureau has devised a method of projection which is believed to be ideal for shows of this kind. The motion picture is projected from behind a large sheet of ground glass, the audience standing in front of the ground glass and thus able to see the picture for

as short or long a time as they desire when passing through the exhibit of the Bureau. This method draws a great many more people than when a dark room is used, in which people do not care to stop for a few minutes.

6. A large map of the Federal-aid highway system which has recently been approved in a setting giving the artist's conception of what this system means to the country.

7. A large combination model and painting, giving a conception of the service of the road to city, suburb and country.

8. A conference room where visitors may meet representatives of the Bureau and discuss any phase of the work of the Bureau in which they may be interested.

**General Motors Truck Company**, Pontiac, Mich., will exhibit two trucks at this show: one Model K-16, which will be equipped with the Lee Gravity Type Dumping Body. This is a one-batch job. The other job will be a Model K-41 equipped with Woods Underbody Hoist and Body. This job will be equipped with pneumatic tires and is designed for handling two batches. This company will distribute a booklet, the subject of which is "Money-Saving Transportation for Road Construction and Maintenance." This booklet outlines the latest practices in efficient transportation of road building materials and also contains a number of tables showing quantities of materials required for various concrete pavements.

**O. K. Clutch and Machinery Co.**, Columbia, Pa., will exhibit a double and single drum hoist equipped with 4-cylinder heavy-duty type engines and also will show a reversible builder's hoist equipped with the same kind of an engine.

**The Hastings Pavement Company**, New York City, will exhibit Asphalt Paving and Flooring Blocks, ingredients used in same and a model section of an asphalt block pavement.

Does not this indicate to the live-wire dealer that this field is highly remunerative, if cultivated properly? And, who is better equipped to render service to the contractor than the motor truck dealer? Is it not logical that the motor truck dealer should be the one to sell equipment to the contractor and keep this machinery in good order with most of the road building machinery depending on gasoline engine power?

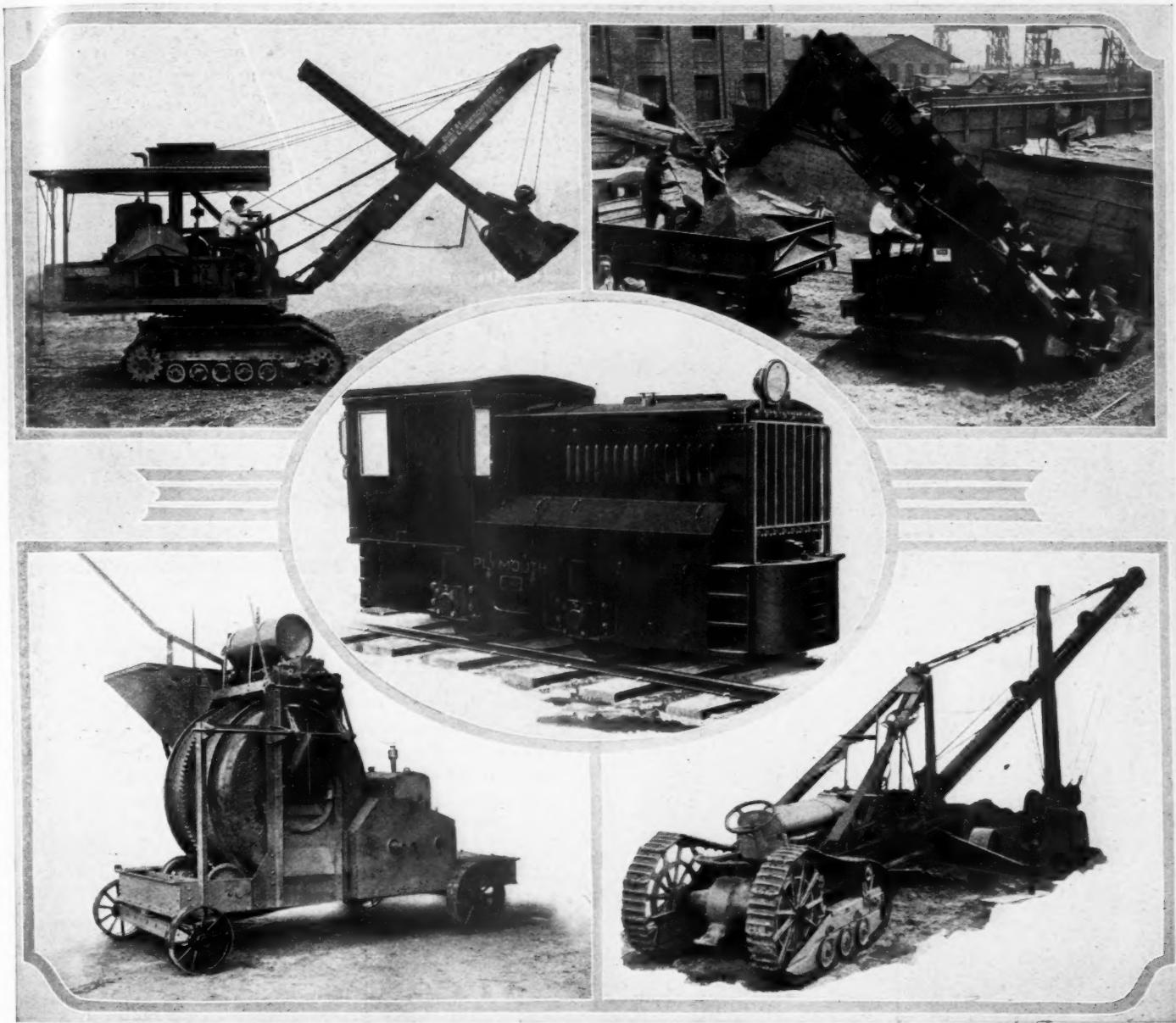
We trust that this issue will be an inspiration to all truck dealers to more closely ally themselves with this business of Road Building. What can develop the more general use of motor trucks more effectively than good roads? What branch of industry offers more sales opportunities than road building?

The future of this country depends on good roads; good roads will do more than anything else to unify the peoples of this nation!

**The White Company**, Cleveland, Ohio, in its exhibit will display a White 2-ton, power dumping truck with batch body and a White truck with pressure distributor for applying bituminous road material. The 2-ton power dumping truck will be equipped with divided batch body and pneumatic tires. The two body compartments with capacity of one yard each make it possible to dump each batch separately directly into the concrete mixer, avoiding waste that occurs when materials are dumped on the ground. With pneumatic tire equipment the possibility of injury to the subgrade is reduced to a minimum. The White truck with pressure distributor applies both heavy and light bituminous road materials under pressure. It consists of a tank, pump auxiliary motor, heating apparatus, circulating system, distributing manifold, temperature, pressure and speed controls, mounted on a standard White 3½-ton chassis.

**The Heil Co.**, Milwaukee, Wis., will demonstrate the sturdiness and quality of its products at the show by a testing rig, patterned after the rigs on the test floor of the Heil Hydro Hoist Co., at Milwaukee. The testing rig will show by means of gages and engineering records that it is possible for the Heil gear pump to develop 1000 lb. pressure per sq. in., thus at all times insuring a mighty volume of reserve strength. The exhibit will also include several photographic enlargements and diagrams, showing the simplicity of the Heil installation.

**The Fate-Root-Heath Co.**, Plymouth, Ohio, will exhibit the following equipment: A Plymouth 7-ton, 4-speed, Gear Drive Locomotive, and a Plymouth 4-ton, 4-speed, Gear Drive Locomotive. The 4-ton Locomotive is new and is just being placed on the market. The 4-ton is very similar in construction to the 7-ton except that it is equipped with a Buda 4-cylinder, 4-in. x 5½-in. engine.



#### Road Building Apparatus Which Depends for Its Motive Power on the Gasoline Engine

Upper Left: Gasoline engine operated shovel to be exhibited by Pawling & Harnischfeger Co., Milwaukee. Upper Right: Truck loader, by the George Haiss Mfg. Co., Inc., New York. This loader is powered by a Waukesha 4-cylinder engine. Lower Left: New model 21-S concrete mixer equipped with batch hopper and automatic water tank, to be shown by the Marsh-Capron Co., Chicago. One feature of this job is the power operated discharge chute which has been worked out along unique lines to make the apparatus fool-proof. This mixer is powered with a 4 x 5-in. four-cylinder Hercules engine. Lower Right: Novel tractor shovel, by the Insley Mfg. Co., Indianapolis. Three of these machines will be demonstrated on a vacant lot near the Coliseum. This machine can be equipped with either a one-third yard bucket, a one-half yard scoop, or a one-quarter yard clamshell bucket. Center: The Plymouth 7-ton locomotive, by The Fate-Root-Heath Co., Plymouth, Ohio. Machines of this type are used to haul big quantities of wet mix from the central mixing plant.

**Insley Mfg. Co.**, Indianapolis, Ind., could not secure space in the Coliseum for its Tractor Shovel, but will have a booth there and three of the machines will be placed in a nearby vacant lot. One of the machines will be equipped as a shovel with a one-third yard bucket, another as a ditcher with a one-half yard scoop, and the third as a crane equipped for handling a one-quarter clamshell bucket. This machine is designed for small excavating jobs. The manufacturers state that its cost is very much lower than any other excavating machine of like sort heretofore produced.

**Oshkosh Motor Truck Mfg. Co.**, Oshkosh, Wis., will feature the Oshkosh 4-Wheel Drive Road Builder in the 2½-yd. type. This job is equipped with mechani-

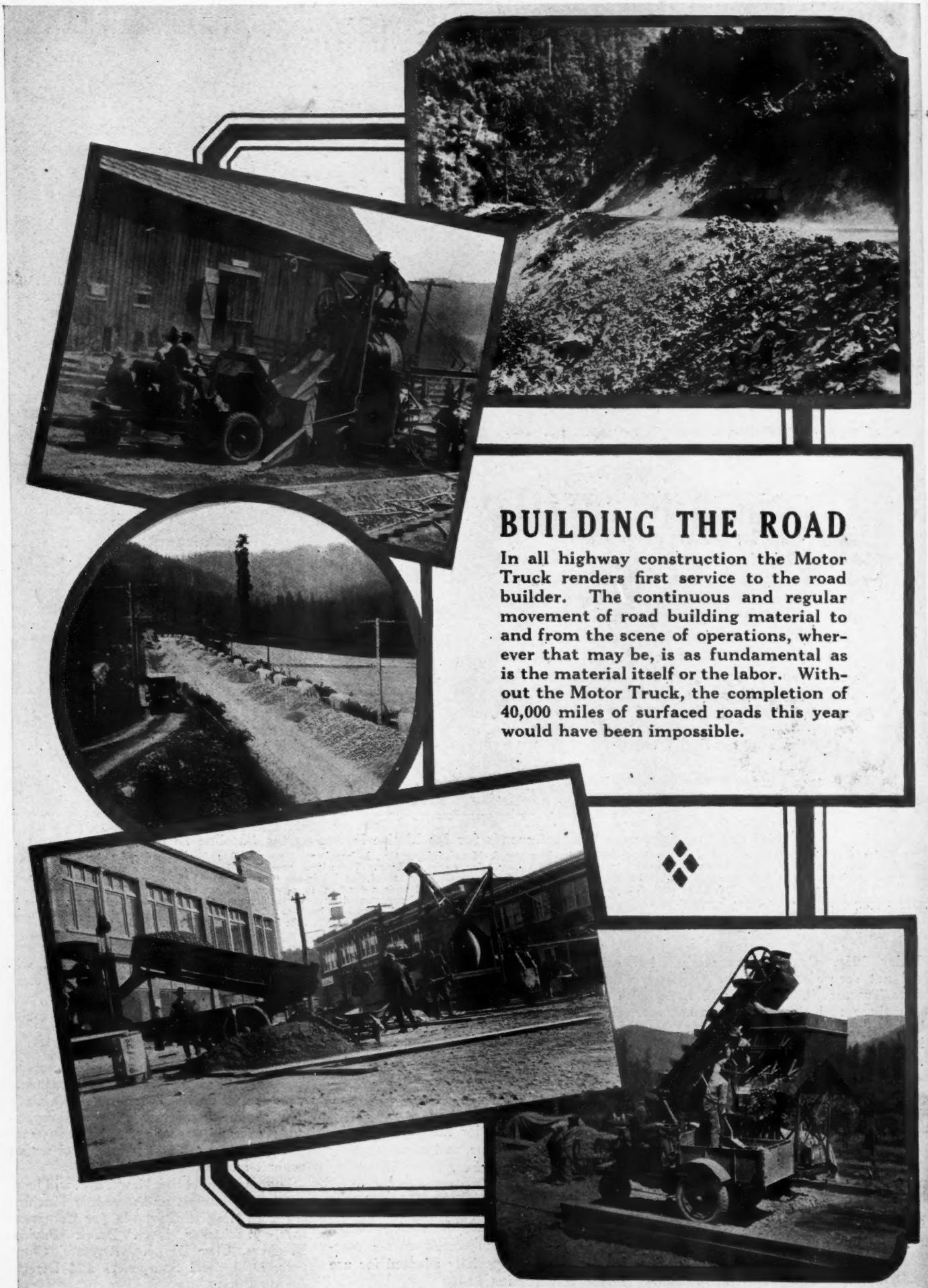
cal hoist which dumps to an angle of 70 degrees. The Oshkosh is flexible and carries its power plant on 3-point suspension, unit type. Due to the successful experience this company has had with this model, and considerable demand for a heavier truck, it is placing on the market a new Oshkosh 4-Wheel Drive 3½-yd. type. This new model will be shown at the Good Roads Show. This new model is considerably heavier than 2½-yd type, having 5 x 6½ engine, and of very sturdy construction throughout.

**Fuller & Johnson Mfg. Co.**, Madison, Wis., in addition to its standard Model N engine, will also exhibit a new model which has just been placed on the market—an engine especially adapted for use in the construction field.

**The Holt Mfg. Co.**, Peoria, Ill., will have a full line of "Caterpillar" Tractors on exhibition comprising 2-ton, 5-ton, and 10-ton models, together with a 5-ton and a snow plow.

**The United States Asphalt Refining Company**, New York, will exhibit samples, literature, photographs, etc., of pavements with special emphasis laid on Akwafalt, a new proposition for treating and repairing roads and streets as well as construction of same, with a combination of water, asphalt and filler.

**Ingersoll-Rand Co.**, New York, will have a working exhibit of Pneumatic Machinery consisting of Portable Air Compressors, Jackhamer Rock Drills, Paving Breakers, Clay Diggers, Riveters, Chippers, Drill Steel Sharpeners and Direct-Acting Pumps.

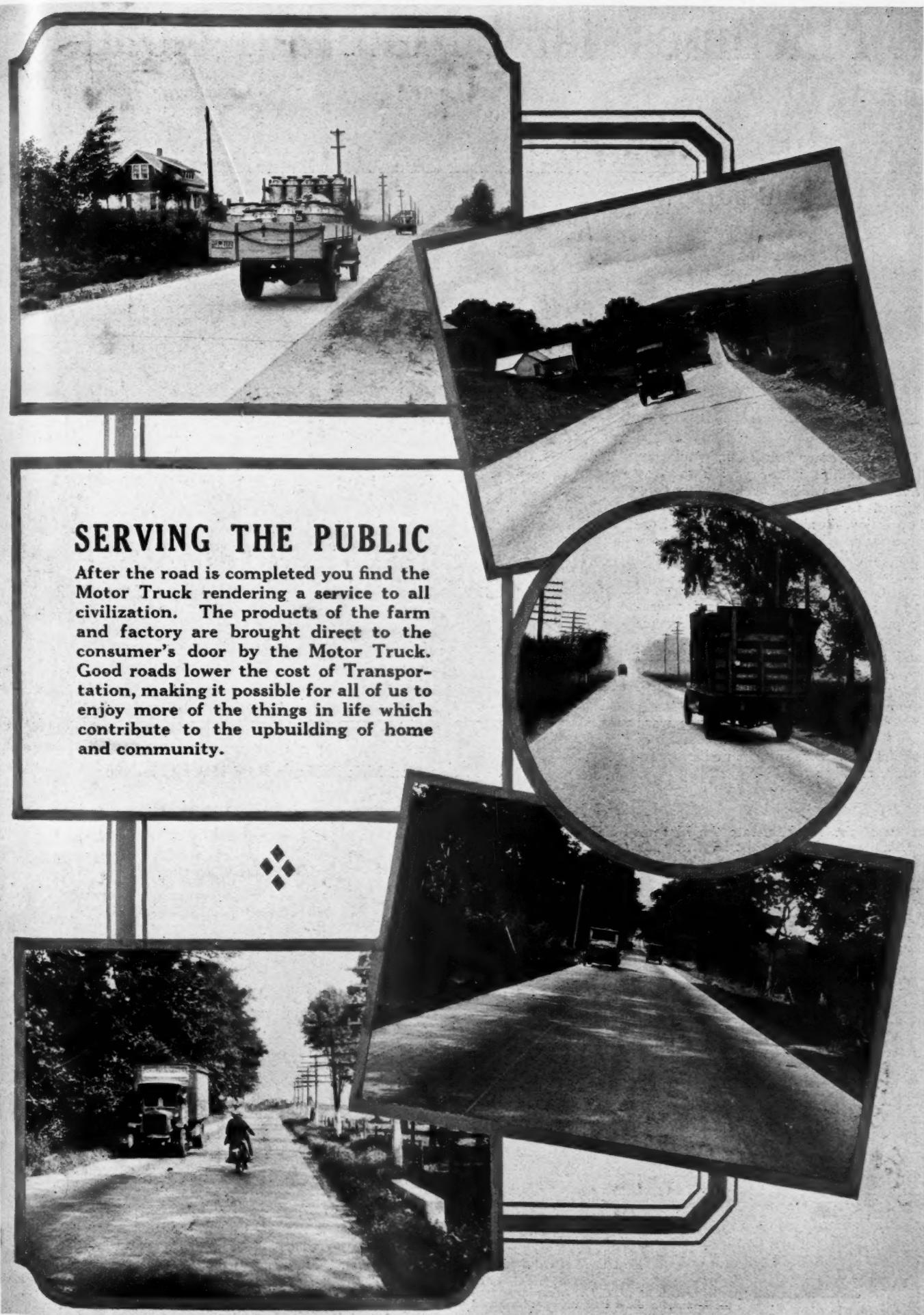


## BUILDING THE ROAD

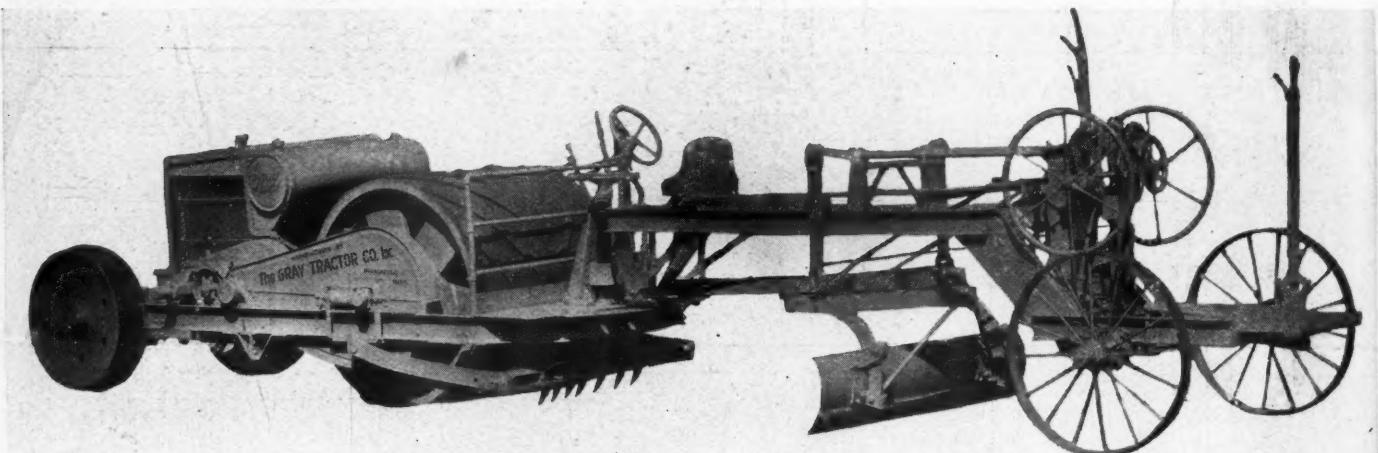
In all highway construction the Motor Truck renders first service to the road builder. The continuous and regular movement of road building material to and from the scene of operations, wherever that may be, is as fundamental as is the material itself or the labor. Without the Motor Truck, the completion of 40,000 miles of surfaced roads this year would have been impossible.

## SERVING THE PUBLIC

After the road is completed you find the Motor Truck rendering a service to all civilization. The products of the farm and factory are brought direct to the consumer's door by the Motor Truck. Good roads lower the cost of Transportation, making it possible for all of us to enjoy more of the things in life which contribute to the upbuilding of home and community.

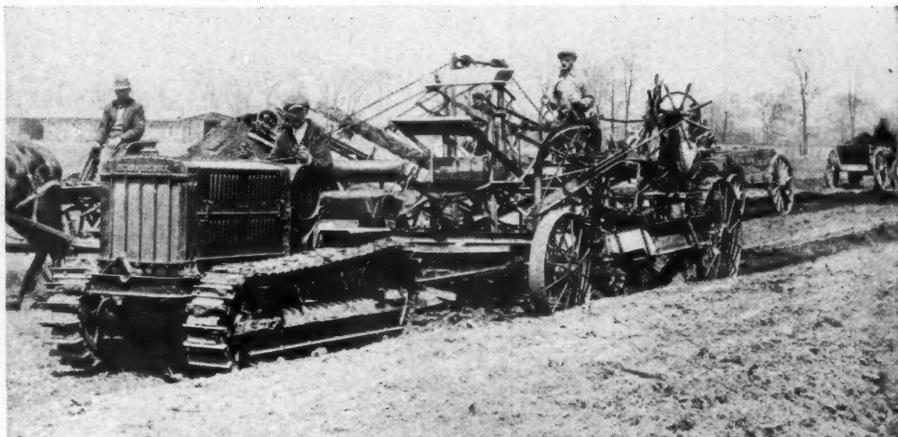


# Machines That Maintain Roads



The Gray Combination Tractor, Scarifier, Grader and Roller

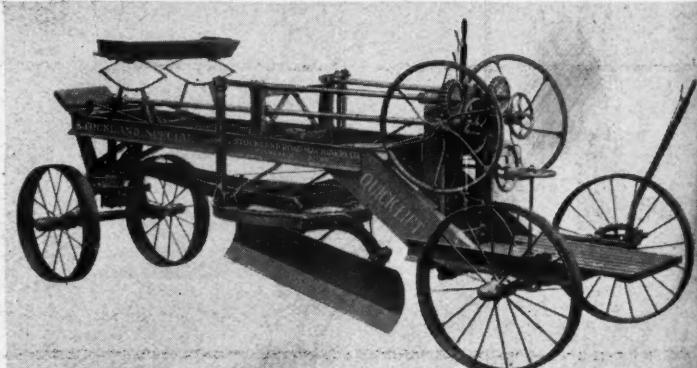
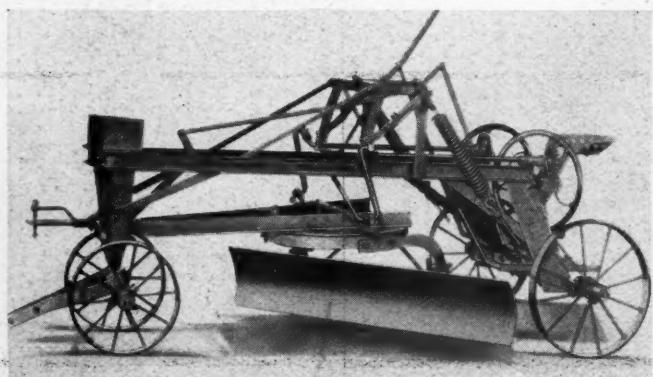
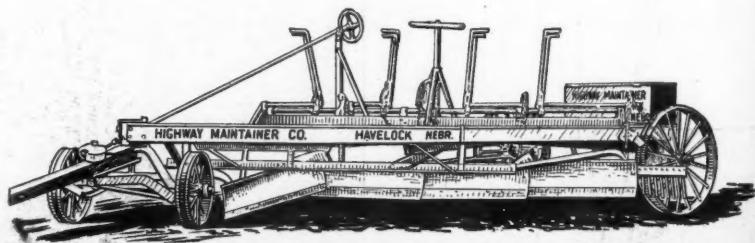
**O'Connell Motor Truck Co.**, Waukegan, Ill., will exhibit its original Two Way Drive Trucks which has been especially designed for road building. Simplicity of operation, durable construction and extreme mobility, are the three great objectives achieved in the construction of this truck. This truck eliminates the necessity for turntables or filling of ditches and removing of forms for turning purposes, and prevents interference with road rollers or supply wagons. They reach the objectives in the most direct way, either backward or forward without turning around. Reverse is secured without power loss over forward speeds, being more efficient when travelling backward since the driving wheels pull instead of push the load. Five speeds in either direction are readily available.



The Bates Steel Mule Pulling a Road Making Machine

On the Right We Illustrate the Havelock Highway Maintainer, Built by the Highway Maintainer Company, Lincoln, Nebraska

This is a multiple blade maintenance machine for dirt highways, maintaining gravel roads and rebuilding old graded roads. This machine is so constructed that one or two blades can be put on the shoulder keeping it clean and squaring out the point of the shoulder; in fact it is so flexible that it can be adjusted to the contour of any road surface desired.



"Peerless" and "Special" Stockland Quicklift Graders

The Stockland Road Machinery Co., Minneapolis, Minn., will have on display two machines illustrated above. The "Peerless" will be in operation and an electric motor will "put it through its tricks," showing in particular the advantage of the "Quicklift." This same exhibit was shown at the Minnesota State Fair where it awakened a great deal of interest among road builders.

**Bear Tractors, Inc.**, New York City, will show the Bear tractor and a display of Bear parts. Moving pictures will show the "Bear" in action in farm scenes, oil fields, lumber camps, street and road making, in maintenance and in snow removal. A "cut-out" engine will be used to display the features of the Bear tractor.

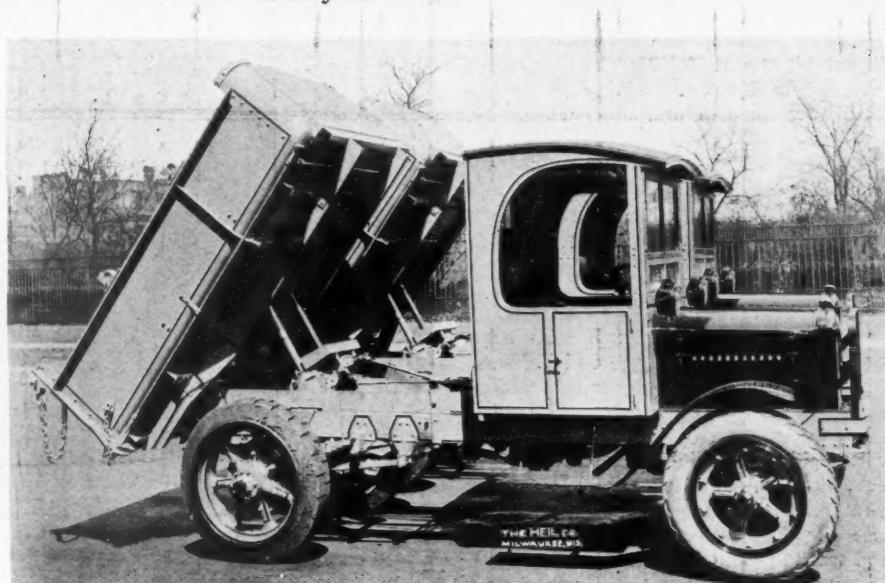
**Monarch Tractors, Inc.**, Watertown, Wis., will exhibit their model 6-60 and 4-40 Industrial Tractors together with the Monarch Twin Rotary Snow Plow. The tractors will have full equipment including self-starter, lights and enclosed cab, and in addition there will be numerous photographs showing the equipment in operation.

**Lakewood Engineering Co.**, exhibit will include the Lakewood Road Finishing Machine, Steel and Wood Sub-graders, Road Form, and Graderooter. This company will introduce at the show a new type light Seven concrete building mixer, and also the Lakewood Screed. Lakewood cars, track and batch boxes will also be exhibited.

**T. L. Smith Co.**, will show its standard Smith Paver and will operate it same as last year. Several models of small concrete mixers, including the Smith Half-Bag Tilting Type Mixer for bridge and culvert work will also be on exhibit.

**The Butler Equipment Co.**, Waukesha, Wis., will exhibit the Butler Aggregate Measuring Hoppers, which are designed to accomplish the quick loading of batch haul trucks. They permit accurate measurement of the concrete aggregates. One man on the ground underneath the bin operates the levers and keeps tally of the loads. With one set of measuring devices the time required for loading is as follows: Single batch, 10 seconds; two batch truck, 25 seconds; three batch truck, 50 seconds and four batch truck, one minute and fifteen seconds. The measuring devices are adjustable to any mix on any paving mixer. The measuring devices are easily attached to a wood or steel loading bin.

**Handy Sack Baler Co.**, Cedar Rapids, Iowa, will have a sack cleaner and baler in operation.



**The Heil RSC Type Dump Bodies and Hoist**

This is one of the many types of Heil equipment well suited for road-building work. The equipment is mounted on 2 1/2 ton Hendrickson trucks. The bodies are of 3 1/3 cu. yds. capacity. They are fitted with two swinging partitions. The double acting tail gate may be regulated for gravel spreading.



**The Bear Tractor Pulling a Road Drag**



**Two Jobs Which Will be Exhibited by the White Company, Cleveland, Ohio**

**Service Motors, Inc.**, Wabash, Ind., will exhibit the Model 25 "Contractruck," a new job designed to embody the principles of low construction, short wheelbase, etc., that could run to the mixer with a load of wet "mix" and get out of the way for the next load. This job is furnished either completely equipped with battery and distributor ignition, electric starting, electric lights, and fenders, or as a stripped chassis less all the above and equipped with magneto ignition. It is low; has pep, power, quick get-away, speed and exceptionally good brakes. Chassis weight is 3650 pounds. Maximum capacity: 6-bag batch or 1½-yard gravity dump. Wheelbase: 111 in. to 123 in. Specifications include: Buda high speed, heavy duty truck type; 3¾-in. x 5½-in. engine. Brown-Lipe Model 30 single dry plate clutch and Brown-Lipe 3-speed transmission; Schuler No. 312, front axle, and Model 1500 Eaton spiral bevel gear fixed hub type rear axle. Road clearance: Front, 8¾ in.; rear, 8½ in. 32-in. x 6-in. pneumatic cord tires front and rear. Turning radius, 15 ft. Body Specifications: Gravity or automatic dumping type of 1½-yd. capacity, automatic trip for tail gate. Body sides flared and tapered to permit clean dumping. Low loading height, 48 in. to 53 in., depending on rocker construction.

**Curtis Pneumatic Machinery Co.**, St. Louis, Mo., will show its Curtis Fordson Air Compressor Unit, which was described and illustrated in our November, 1923 issue, page 56.

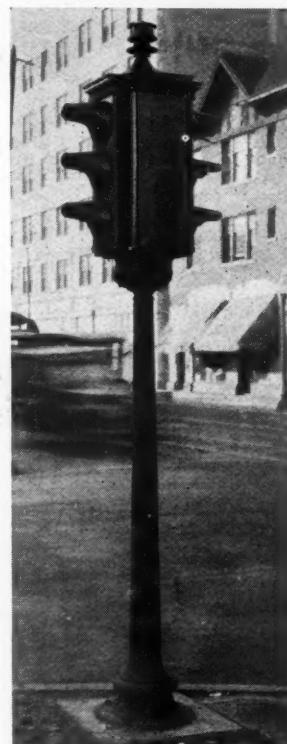
**Overman Cushion Tire Company**, New York City, will display the Overman Cushion Tire for which an average life of 40,000 miles is claimed in road building work.

**Chicago Tube and Iron Company**, Chicago, Ill., will exhibit pumps for every character of contracting and construction service, as well as pipe, pipe fittings, hose, etc. This company specializes in complete water service systems for road and other contractors.

**Truscon Steel Company**, Youngstown, Ohio, will display samples of its mesh fabric for use in road construction, as well as other products along this line.



The Service "Contractruck" a New Job of Low Construction



Essco Traffic Signal

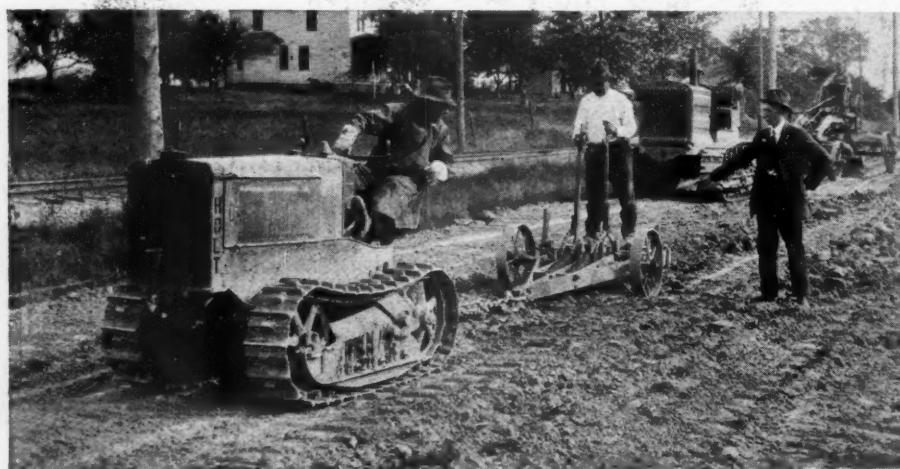
**Essco Manufacturing Co.**, Peoria, Ill., will have on display a complete line of Mushroom Traffic Lights as well as its complete line of Stop and Go Signals.

**The Gray Tractor Co.**, Minneapolis, Minn., will exhibit a combination tractor, scarifier, grader and roller, powered with a 50 h. p. Waukesha motor and the grader is of the quicklift type. The Gray Giant scarifies, grades and rolls tough macadam and unpaved roads and streets with remarkable rapidity. The 50 h. p. tractor, scarifier, and roller are integral and are operated by one man. The grader unit attaches behind the scarifier and may be instantly detached, if desired. Traction is furnished by the heavy wide drum roller whose broad surface grips the ground.

As the scarifier block is set immediately behind the roller and is raised and lowered by means of a screw pedestal it is possible to put four or five tons of weight onto the scarifier teeth which assures a deep and uniform cut in the surface of the hardest unpaved road or street. The grader unit is equipped with a quicklift device which raises or lowers the blade instantly and enables the grader operator to avoid manholes, crossings, culverts, or any other obstacles encountered. In street work the Gray Giant has an added advantage in its ability to work between car tracks, thus rebuilding the entire width of the street. This feature will appeal particularly to municipalities having a large number of unpaved streets transversed by street car lines, for general experience shows that the street between car tracks and inside car tracks is very hard to keep up and for this reason injures both the appearance and efficiency of the street.

**Electric Wheel Co.**, Quincy, Ill., will exhibit the EWX Heavy Duty 4-Cylinder Engine which will be mounted on a stand to permit easy inspection. This is only one of a complete line of engines ranging from 20 to 75 hp. manufactured by this company. These engines are also furnished complete with radiator, fan, fuel tanks, mounting and canopy with pulley or special connection, ready to use with any kind of road-building or contractors' machinery or they can be furnished on skids so that they can be used as portable or stationary power plants.

**American Tar Products Co.**, Chicago, Ill., exhibit will show Tarmac literature and photographs of roads in various parts of the country on which Tarmac has been used.



Holt Two-Ton "Caterpillar" in Action



International Motor Company, Will Show the Mack Contractors' Special

**Wood Hydraulic Hoist & Body Co.**, Detroit, Mich., expect to show the following: Road builder equipment consisting of an Underbody Hoist and a special road building body mounted on a stand and operated on a stand and operated by an electric motor.

A standard vertical hoist mounted on a stand, completely finished as an exhibition job, in special paint and nickel trimmings.

Vertical Hoist No. 22, will represent one of the very first hydraulic hoists built. It will be especially painted for exhibition purposes.

An Underbody Hoist, cutaway to expose parts.

A complete line of power take-off devices for various makes of transmissions.

Highly finished hoist parts mounted on display boards. Interesting picture of Gar Wood, and his speed boats. Complete model, one third size of an Underbody Hoist and Body in operation. This company has given a great deal of thought to its exhibit, and expects to have one of the most striking displays of hydraulic hoists and steel dump bodies ever been shown at any show.

**The Hug Co.**, Highland, Ill., will exhibit a new Hug speed chassis, also a new turntable, and a new subgrade planer. A feature of the new Hug Speed Truck for 1924, is the special body which gives ton center of gravity, while the weight is thrown well forward of the rear axle. On the road the body is locked, wedge-tight, preventing rocking and racking. The opening design has been improved to permit greater speed on rough hauls. Two sizes are being offered, one for the 4 to 5-bag batch and one for the 6 to 7-bag batch. The new Hug turntable can easily turn a loaded truck on the subgrade, and as the turntable is set to one side of the subgrade there is ample clearance on an eighteen-foot roadway for empty trucks to pass aside of the turntable. This turntable is being built by the Hug Company in addition to the old type turntables and other road builders' equipment.

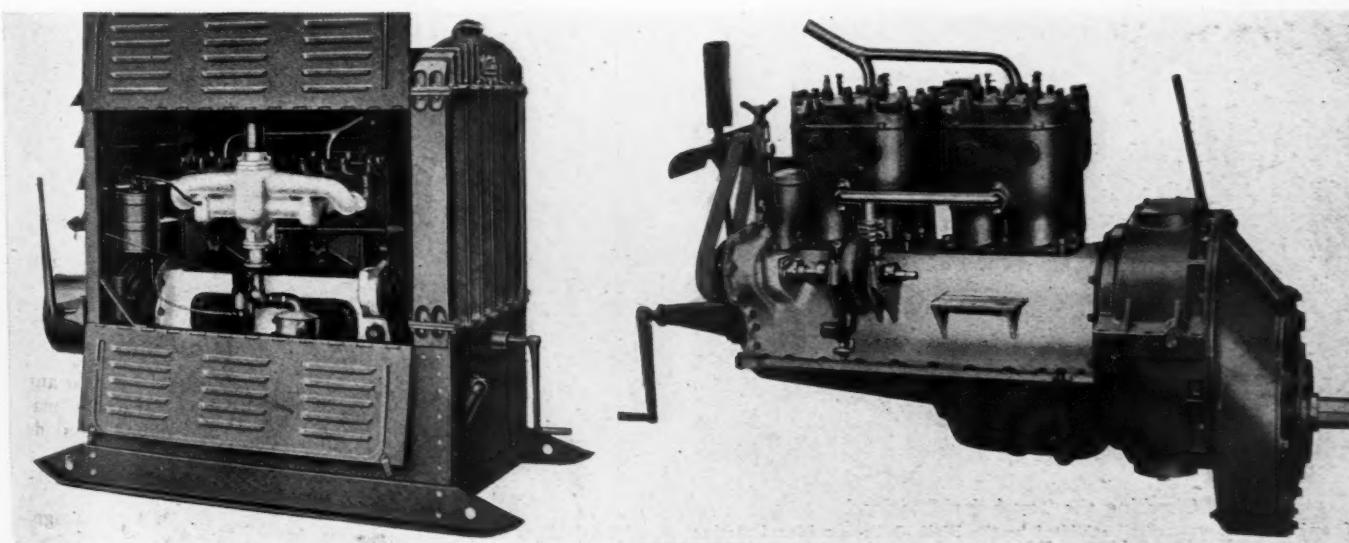
**B. M. Cropp Company**, Chicago, Ill., will show one of its Standard Low Charging Mixers, mounted on rubber tired wheels.

**American Products and Trading Co.**, Chicago, Ill., will have on display a new designed 30 cu. ft. scoop gravity dump body for Ford trucks built especially to eliminate all body troubles for road contractors' use. This body is fool-proof in every way, and is built very sturdily for this class of work, cutting down all working parts to a minimum. It has a very low loading edge, standing 58 in. from the ground. This company will also show a standard No. 2510 one yard flat type body which is exceptionally strong and sturdily built. The load on this body is well distributed, and the center of gravity of the load longitudinally is carried 14 to 18 in. ahead of the rear axle. This cuts down side swaying on the Ford truck, as well as repair bills on the rear end to a minimum. This design is especially efficient on a Ford truck on account of the hump-back spring construction.

**The East Iron & Machine Co.**, Lima, Ohio, will exhibit the Improved Merriam Asphalt Plant, also very likely introduce the new Mosher plant—a new two-unit portable road plant of improved type and design.

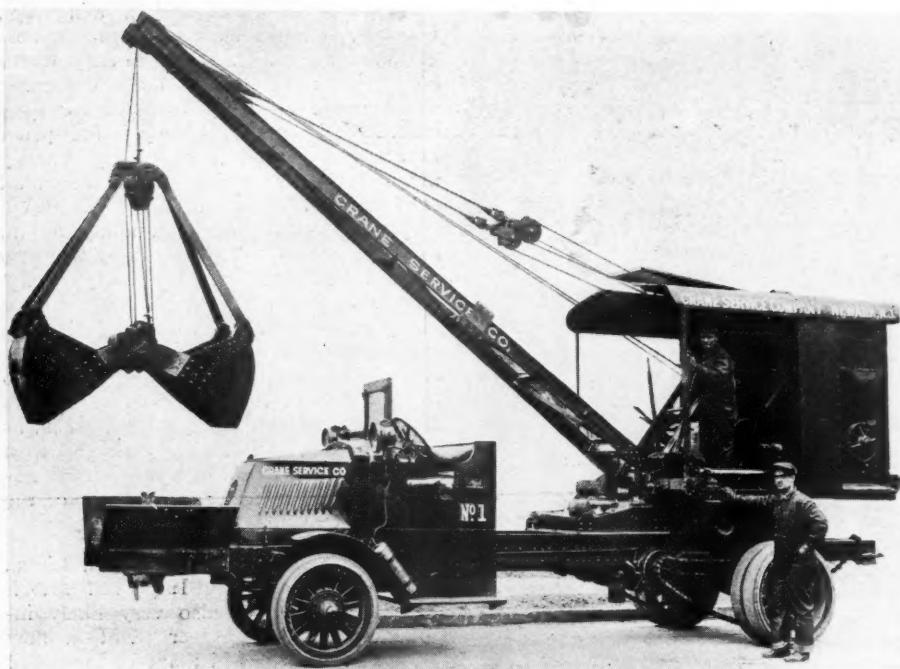
**Western Wheeled Scraper Co.**, Aurora, Ill., will confine its exhibit to that of road builders' batch boxes and trucks or cars used for carrying proportioned batches in concrete road building with what is known as industrial haulage. In addition, a large rack of illustrations, showing the full Western line of road building machinery, and some models of Western dump cars, will be shown.

**Sullivan Machinery Co.**, Chicago, Ill., will show two types of portable air compressors, one Class WK-311, operated by direct connected gasoline, and one Class WK-34 operated by belt from a Fordson tractor. Various types of compressed air hammer drills for rock drilling, breaking concrete pavement, etc., will also be displayed.



Waukesha Industrial Power-Plant and Waukesha Engine With Reduction Gear

The Waukesha Motor Co., Waukesha, Wis., will exhibit the above units also a Waukesha engine with power take-off. The industrial unit is designed to meet the requirements of any belt horsepower from 20 to 45. The application of the reduction gear housing is unique as it can be applied to the main engine housing in five different positions, to bring the drive pinion in the most convenient position for meshing it with its mating gear.



**Universal Crane, in the Service of the Crane Service Company, of Newark, N. J.**  
A machine of this type will be exhibited by the Universal Crane Co., of Elyria, Ohio. This crane is equipped with 2-ft. boom bucket, counter weight device, winch attachment, and 1½-yd. Owen Type J Bucket, mounted on a 7½-ton Mack truck, equipped with front extension, which they regularly furnish for mounting pumps, etc., to which bent plates have been added as a bucket carrier.

**The Trailmobile Co.**, Cincinnati, Ohio, will exhibit its model "Z-5-D" 5-ton dump Trailmobile, which is specially designed for use with the Fordson tractor. The body is of the rolloff type, and has a capacity of 5-tons. It holds 3 yards at water level, or an actual weight of 4 to 5 tons level of sand, gravel, broken rock and heavy materials. Crowning the load may increase the weight of pay load to approximately 6 tons. Extra side boards are provided for use when hauling bulky and light materials such as coal and coke, making the load capacity 4½ yards level.

**Equipment Corporation of America**, Chicago, Ill., will exhibit a Tandem Steam Road Roller and an Electric Double Drum Hoist with attached swinging gear, with counterweight holding drum for operating derricks and clam shell buckets. This company will probably be the only exhibitor of rebuilt equipment at the show. It also rents equipment in addition to selling same.

**Koehring Company**, Milwaukee, Wis., will show Koehring 21E paver, one Koehring shovel with crane boom and one Dandie light mixer.

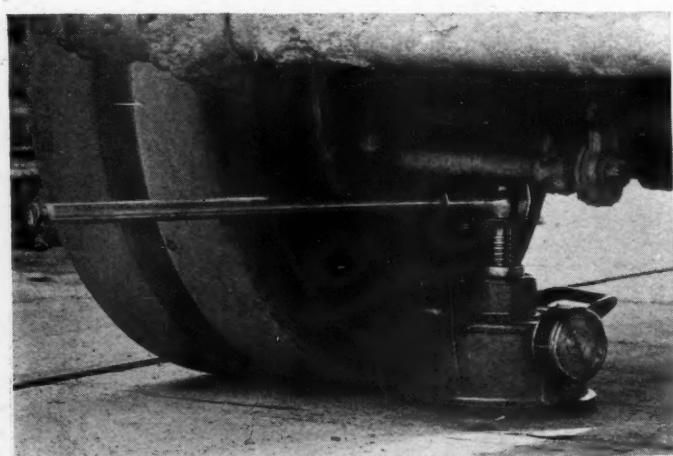
**The Dow Chemical Company**, Midland, Mich., will show Dowflake, which is used for dust prevention and road binder and concrete curing. The exhibit will consist of representative samples of material, photographs of the application and use, together with large quantities of data concerning the results to be obtained with this product.

**The Lufkin Rule Co.**, Saginaw, Mich., will exhibit principally measuring tapes in all patterns and grades specially adapted for highway work. This covers tapes used in highway work from original surveys and engineering to the construction, inspection and measuring of the finished road. There will be included also a showing of boxwood, spring joint, and folding steel rules.

**Sivyer Steel Casting Co.**, Milwaukee, Wis., will exhibit various cast parts which this company manufactures for the road machinery industry and will include, as a large part of the exhibit, a display of track shoes. The Sivyer Steel Casting Company has had a wide experience in the making of track shoes and is at present casting them for nine different road machines. The exhibit in general will consist of gears, pinions, sprockets, brackets, rollers, chain guards, sheaves, bearings and the general run of steel castings used in road machinery.

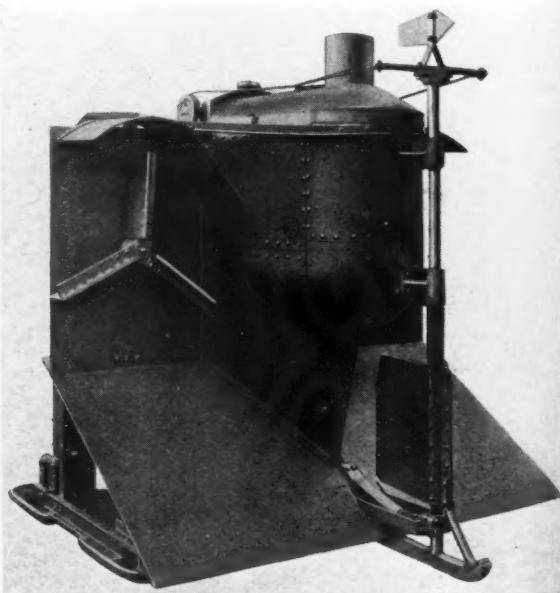
**Kentucky Rock Asphalt Co.**, Louisville, Ky., will exhibit samples of natural asphalt rock from quarries near Mammoth Cave, Ky., also the ground pulverized asphalt rock or Kentucky Rock Asphalt. Models showing Kentucky Asphalt construction, both foundation and asphalt surface, and pieces of rock asphalt surfaces cut from old roads and streets. The remainder of this exhibit will consist of photographs and blue prints.

**American Bosch Magneto Corp.**, Springfield, Mass., will exhibit various models of the Bosch magneto, the Bosch generator and Bosch battery ignition timers.



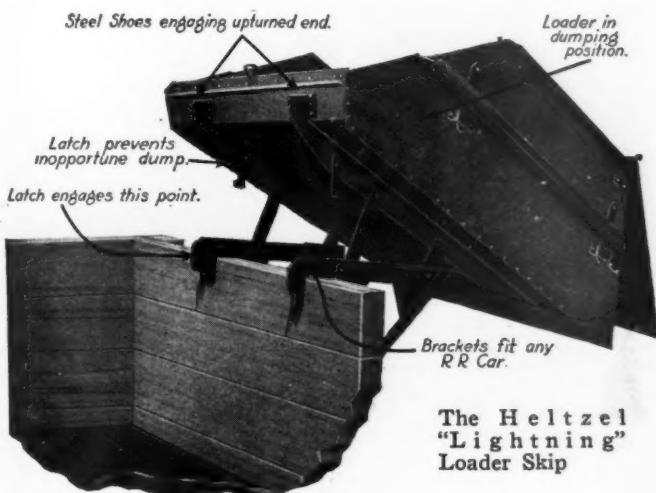
**Checking the Truck for Overload**

Showing the "Loadometer" exhibited by the Black & Decker Manufacturing Co., Towson Heights, Baltimore, Md. Two of these instruments comprise a set. The Loadometers are used in pairs in some states and counties; and in other places, in order to save time, four constitute a set. Suspected overloads can be weighed wherever found, saving time for both the road police and the truck owner and avoiding unpleasantness and criticism which frequently arise when it is necessary to take a suspected truck to a permanent scale.



**Novel Snow Plow Which Will be Exhibited by Monarch Tractors, Inc., of Watertown, Wis.**

The Heltzel Steel Form & Iron Co., of Warren, Ohio, will exhibit the "Lightning" Loader Skip which is a time and labor saver in the trucking of all such materials as sand, gravel, etc. The Loader Skip attaches to any height of freight car, and the shovels are at work filling it while the trucks are making the trip to and from their destination. When the truck arrives, the full load is dumped into the truck, eliminating all delay as under such conditions as where the truck is loaded direct by the shovelers. These Skips are attached to any open railroad car, by one or two men, in a few seconds. They can be used on extremely low cars to load a truck of extreme height, as height of loader skip and angle of dump are subject to instant regulation. They are built ruggedly, yet designed without any obstructions to wedge the load, and there are only six parts, facilitating easy assembly and removing.



The Heltzel  
"Lightning"  
Loader Skip

The Link-Belt Co., Chicago, Ill., has just announced a new crawler tread portable loader, which is capable of cutting a path twenty feet in width, through a pile of material by means of the swiveling feature. It will be exhibited at the Chicago Show.

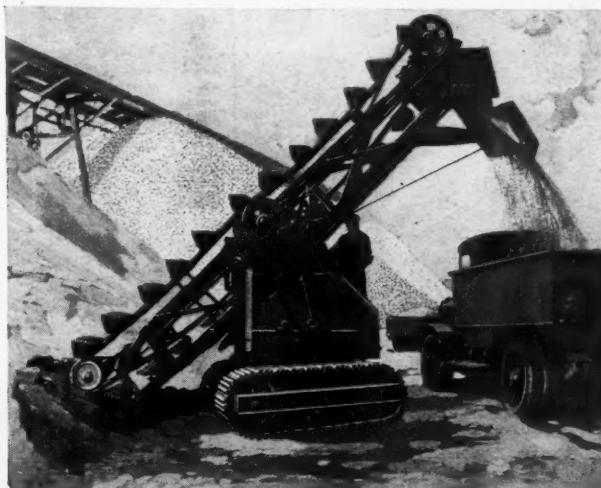
This new industrial loader is known as the "Grizzly." It is the large capacity, heavy duty loader of the Link-Belt group—a sort of "parent" to the "Cub" portable belt conveyor, which is extensively used in small yards for loading material into trucks, etc.

Besides adding the crawler mechanism to the "Grizzly," still another feature was incorporated—that of making the lower base of solid, cast-steel construction. This feature eliminates numerous rivet and bolt connections and produces greater durability and rigidity. The lower base, which carries the loading mechanism, pivots on the tread in similar fashion to that employed by the larger and more expensive locomotive cranes.

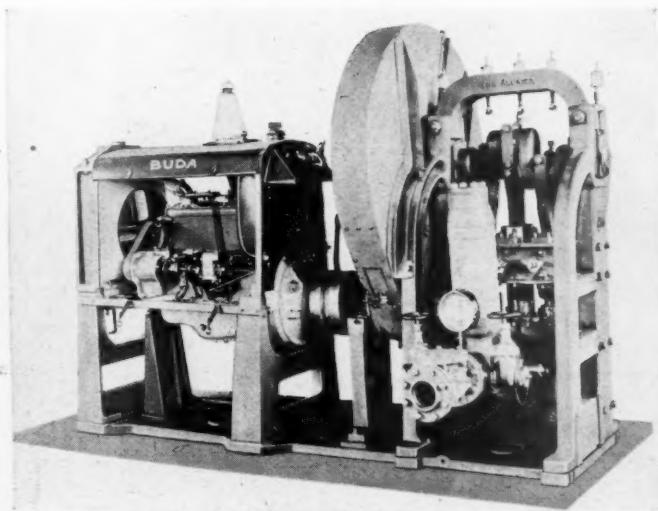
The tread shoes are of alloy, heat-treated steel, cast in one piece and are attached by a patented design which has proved exceptionally capable of self-clean-

ing. One of the principal features of this loader is its ability to swivel and swing independently of the tread base. It can back into a pile, dig, swivel and elevate at the same time—or it can do any of these operations independently—all at the will of the operator. The capacity varies with the material handled. A capacity of 45 cu. ft. per min. is claimed while handling bituminous coal. About the same rate of speed is given for sand and about 40 cu. ft. per min. with 1½ in. and under crushed stone. It is driven by a gasoline engine of ample power and of standard design.

Racine Radiator Co., Racine, Wis., will exhibit radiators used on road building trucks and for industrial machinery power units. The Perfex Radiator is primarily a heavy-duty radiator and especially engineered and built for the industrial trade. The cores are built of heavy .006 special bronze material which has a very high tensile strength. The tubes are made of one piece of material. On account of the close application of the tubes more cooling area is obtained for a given frontal area of the radiator and renders greater efficiency. The cores are unconditionally guaranteed not to burst even from continuous freezing which is a very important thing to the contractor in winter.

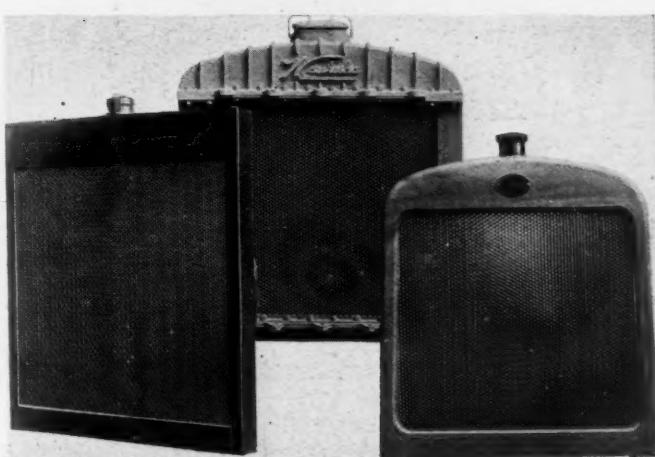


The New "Grizzly" Loader by Link-Belt



The Buda Exhibit

The Buda Co., Harvey, Ill., will exhibit an Aldrich triflex pump equipped with a Buda Power Unit. In connection with its unit power plant the Buda Co., can furnish a Spur Gear Reducer or a Spur Gear Speed Accelerator, also a self-starter with battery. The power plant can be furnished without steel sub-base when it is desired to mount it on I-beams or channels of any machine to which it is to be connected. Also mounted on skids for portable power purposes.



Racine Industrial and Truck Type Radiators



**Anthony Standard Rocker Dump Body**

The Anthony Co., Inc., Streator, Ill., will exhibit three types of its automatic dumping bodies mounted on Ford trucks. These include a low body, a standard job (illustrated) and a 6 batch job.

**Clyde Iron Works Sales Co.**, Duluth, Minn., will feature a builders' hoist. The hoist is driven with a silent belt chain from a four-cylinder gasoline engine and has a reversible independent elevator sheave, completely independent of the drums. The hoist is built with either one or two drums, and has an independent clutch to operate the elevator sheave which permits double cage operation and does not interfere with friction drums while performing any of their hoisting duties.

**Avery Co.**, Peoria, Ill., will exhibit the Avery Track-Runner Tractor, Avery One-Man Road-Razer, and the Avery 25-50, 10-ton Road-Roller, equipped with Power Scarifier.

**Blaw-Knox Co.**, Pittsburgh, Penna., will exhibit the following: Actual operation of full-size 65-Ton Blaw-Knox "Batchplant" (Trussed Bin Type). Models of 116-Ton "Batcherplant," Suspension Type "Batcherplant," Duplex Type "Batcherplant," and Circular Bin. Full-size  $\frac{3}{4}$ -Yard Blaw-Knox "Dreadnaught" Clamshell Bucket. Models of Blaw-Knox "Single-Line," "Speedster" and "Power Wheel" Buckets. Load-test demonstration of Blaw-Knox Road Forms. Blaw-Knox Universal Forms for street, sidewalk and curb and gutter work. Blaw-Knox Cement Handling Apparatus. Models of 5-ton and 1½-ton Blaw-Knox Truck Turntables.

**C. H. & E. Manufacturing Co., Inc.**, Milwaukee, Wis., will show its No. 9 Triplex Pump; No. 11 Triplex Pump; No. 11 Centrifugal Pump; No. 18-A Saw Rig and No. 14 Reversible Hoist. The Triplex pumps are for road-builders in forcing water along the road to supply water for mixers, excavators, etc.

**Pittsburgh Testing Laboratory**, Pittsburgh, Penna., will exhibit literature describing the various kinds of service that the Pittsburgh Testing Laboratory is prepared to render to its clients.

**Wiard Plow Co.**, Batavia, N. Y., will exhibit its No. 69 plow and No. 64 plow, designed especially for road work. The exhibit will be in charge of Sales Manager S. J. Hunt, and J. W. Justin, western representative.

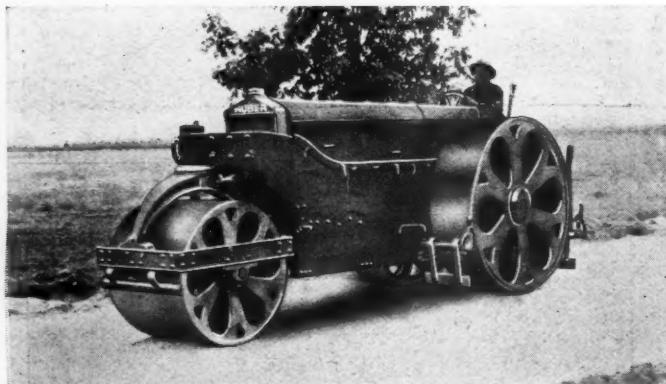


**Where Automobile Parts Function**

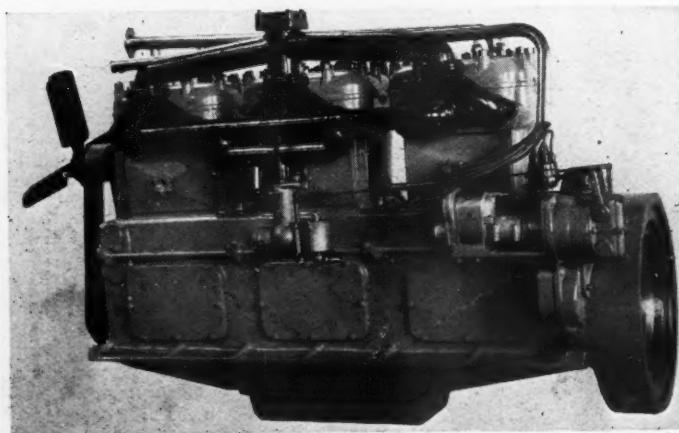
A number of small concrete mixers are now being offered, which are mounted on trailers. The above outfit, to be exhibited by the Marsh-Capron Co., of Chicago, is a light portable half-bag mixer on a trailer. The wheels, tires and wheel spindles interchange with standard Ford parts. Wheels as furnished are equipped with Timken roller bearings.

**W. S. Godwin Company**, Baltimore, Md., will exhibit full-sized section of street railway paving, showing how steel paving guards protect any kind of paving adjacent to grooved or Tee rails, also full-sized sections of asphalt, bituminous and concrete roads protected along the edges with different sizes and shapes of paving guards.

**The Petroleum Motors Corp.**, Rockford, Ill., will show the Jackson Petroleum Engine, which utilizes either kerosene or distillate for fuel. This engine is unique in design as it incorporates two pistons in each cylinder, so that the full power of the explosion in each cylinder is utilized upward as well as downward.

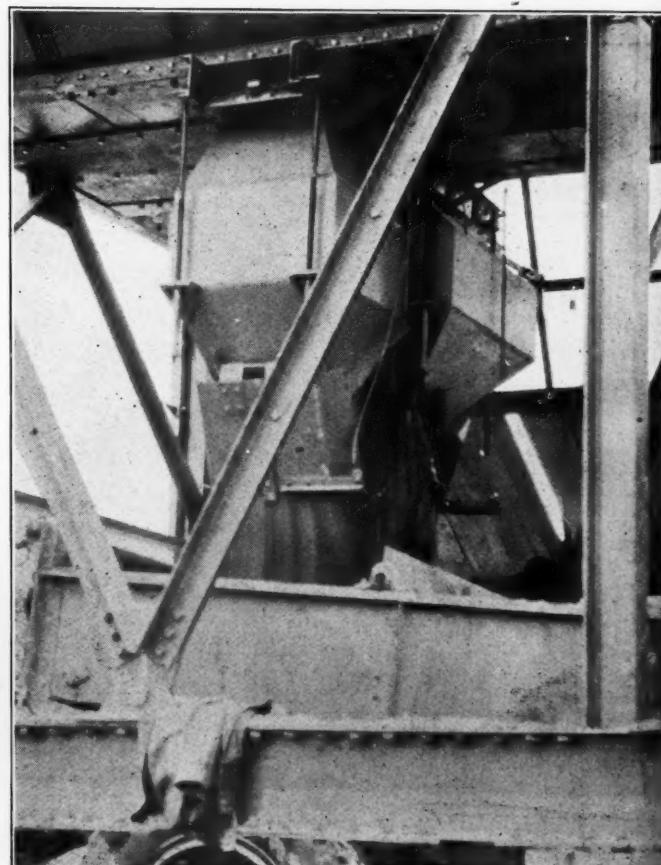


**Huber Motor Roller to be Exhibited by the Huber Manufacturing Company, Marion, Ohio**

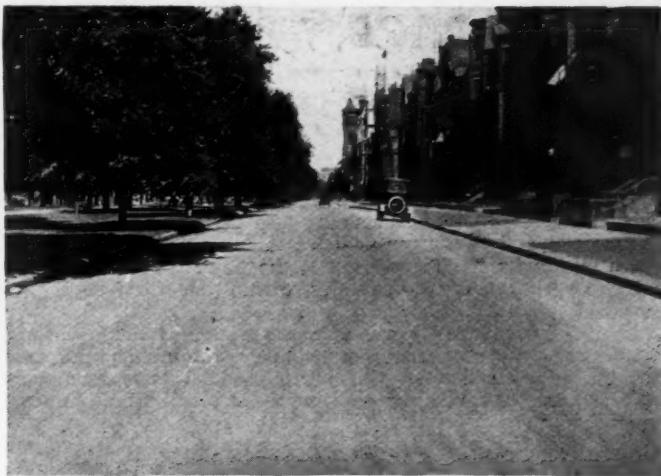


**Climax Six-Cylinder Engine**

This model, a  $5\frac{1}{2} \times 7$  in., mounted on base ready to be connected to a generator or pump will be exhibited by the Climax Engineering Co., of Clinton, Iowa. A model "KU," four-cylinder,  $5 \times 6\frac{1}{2}$  in., mounted on pedestal and a model "TU," four-cylinder,  $5\frac{1}{2} \times 7$  in. will complete this exhibit.

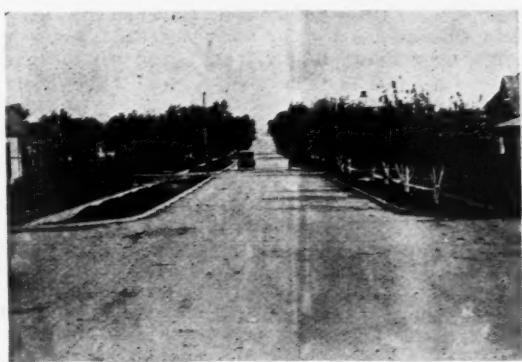


**The Butler Aggregate Mixing Hopper**  
which permits accurate measuring of concrete aggregates. Built by the Butler Equipment Co., Waukesha, Wis.



Commonwealth Ave., Boston, Mass., Refinished With Bithulitic Asphalt Surface

BEFORE



South 6th St., Lawton, Comanche Co., Oklahoma, Concrete Road

AND AFTER



Main St., Haynesville, La., Concrete Road



Main Post Road, Portland to Brunswick, Surfaced With Asphaltic Macadam About 1915

# What the State Highway Departments Plan for 1924

**T**HE country-wide road building program will continue without interruption into the year of 1924, and the scale of construction will increase rather than diminish. Roads capable of sustaining the economic and comfortable passage of both commercial and passenger vehicles to fairly large sized industrial communities anywhere within its boundary lines is the objective of most states. A fine network of roads covering every community within our forty-eight states is gradually being perfected.

Funds for the 1924 schedule are made available through three main sources. Either from the revenues obtained from automobile and gasoline taxation, or from new or old bond issues. Of course, Federal assistance is still provided under the arrangement set forth in the Federal-aid plan. Some states also depend on county support.

In order to determine the exact status of the 1924 program of road building and what it means to commercial car dealers from an equipment angle we recently sent out a questionnaire to the Highway Departments of the forty-eight states. In this questionnaire we asked how many miles of new roads were expected to be built in 1924; whether any special appropriations for 1924 road maintenance have been or will be made; whether 1924 activities were dependent upon the approval of any bond issues; whether contractors in their particular state would be in the market for a great deal of new equipment, particularly motor trucks, and what capacity motor trucks were most favored?

Believing that the better way of presenting this interesting information is by offering it as we received it we are excerpting from the letters the paragraphs bearing directly on the questions asked.

#### NORTH CAROLINA STATE HIGHWAY COMMISSION

\* \* \* expect to put under construction, or contract, approximately \$20,000,000 worth of roads during 1924, or something like 800 miles, part of which will be hard surface. Maintenance funds are provided from the 3-cent tax on gasoline. Activities for 1924 are not dependent on any bond issue since the Legislature of 1921 authorized a \$50,000-000 bond issue and the Legislature of 1923 an additional \$15,000,000 bond issue.—H. K. Witherspoon, Publicity Engineer.

#### CALIFORNIA HIGHWAY COMMISSION

No special appropriations for road maintenance but the two cent gasoline tax and the motor vehicle fees are divided between the state and the counties equally and the state's share is specifically reserved for rebuilding and maintenance during the next two years.

1924 program does not depend upon bond issues. Some funds left from the 1919 issue of \$40,000,000 for primary construction.—Frank B. Durkee, Bulletin Editor.

Construction work to the total of \$5,000,000 for widening and thickening of existing paved state highways will be placed under contract in California within the next few months. It is estimated that the state's share of the gasoline tax and the motor vehicle fees will be at least \$7,500,000 for 1924. Surveys and plans are under way for considerable work on the main trunk lines in accordance with the announced policy of the highway commission and the engineering department.—R. M. Morton, State Highway Engineer.

#### STATE OF ILLINOIS

The program for 1924 is the construction of 1000 miles of hard-surfaced roads. There have been completed during 1923 up to the present time 1036.33 miles. \$3,000,000 has been appropriated for maintenance for two years. Not dependent on bond issues.—Frank T. Sheets, Supt. of Highways.

#### ARIZONA HIGHWAY DEPARTMENT

Program for 1924 not yet definitely decided. There is at this time a slight agitation for a State bond issue, which, if successful, will

materially change any plans that we may make.

The state appropriation for maintenance is the total of the motor vehicle fee collection. Do not think that the contractors in this state will be in the market for much new equipment, unless the above mentioned bond issue is put through. From our observation the one-ton truck and the three and three and a half-ton truck are the most successful units for the contracting business in this state.—W. W. Lane, Asst. State Engineer.

#### STATE OF WASHINGTON

The 1924 schedule will include: Grading and graveling 200 miles, paving with concrete 53 miles. The state legislature has appropriated \$1,500,000 for road maintenance purposes during the year 1924.

The road program for 1924 does not depend upon the approval of bond issues. 3½ and 5-ton capacity trucks seem to be favored.—James Allen, State Highway Engineer.

#### STATE HIGHWAY DEPARTMENT OF GEORGIA

\* \* \* expect to build during the year 1924 about 750 miles of highways. \* \* \* roads are maintained from the funds received from the sale of motor vehicle license tags. As the last legislature passed a two cent gasoline tax in this state, it will not be necessary that we depend upon the approval of bond issues, for our 1924 activities.

\* \* \* it is my opinion that the contractors in this state will be in need of much new equipment next year, particularly motor trucks from 1½ to 2-ton capacity.—W. R. Neel, State Highway Engineer.

#### GOVERNMENT OF THE DISTRICT OF COLUMBIA

\* \* \* our road paving for the current fiscal year (to July 1st, 1924), is completed and the funds for the succeeding fiscal year have not yet been provided by Congress by which body annual appropriations for road maintenance are made. Our funds are derived from current revenues.—C. B. Hunt, Engineer of Highways, D. C.

#### STATE OF NEVADA

\* \* \* it is estimated that 150 miles of graveled highway will cover our 1924 program. Appropriations for maintenance is budgeted and all roads constructed are maintained by this department under the specifications of the U. S. Bureau of Roads. Roads not on the State Highway system or roads on the Highway system that have not been approved, are not maintained by the department. The various counties take care of maintenance in these cases.

1924 activities are not dependent on the approval of any bond issues—rather upon a continuation of Federal-aid.

\* \* \* would say that trucks from two and a half to five yard capacity are generally used and favored by the contractor.—Geo. W. Borden, State Highway Engineer.

#### OREGON STATE HIGHWAY COMMISSION

Our program for next year's work has not as yet been worked out, but it is likely that we shall grade approximately two hundred miles of new highway; surface with rock and gravel approximately three hundred miles of graded highway; and pave approximately twenty miles of previously graded and surfaced highway.

No special appropriation has been made for road maintenance, but it is likely that our expenditures for that purpose during 1924 will aggregate approximately \$1,000,000.

We do not believe that the contractors in this state will be in the market for any considerable quantity of new equipment, due to the fact that the work which we will do during 1924 represents a considerable fall off in the volume of work which has been performed during each of the past several years. Contractors are about equally divided in favoring three and one-half and five-ton trucks.—Roy A. Klein, State Highway Engineer.

#### THE STATE OF UTAH

Expect to build 100 to 150 miles during 1924. No special appropriations are made for road maintenance, and the activities for 1924 do not depend upon the approval of any bond issue. It is doubtful if the contractors will be in the market for new equipment. The contractors seem to favor three to five-ton capacity motor trucks.—Howard C. Means, Chief Engineer.

#### SOUTH CAROLINA STATE HIGHWAY DEPARTMENT

New roads expected to be built during 1924 are approximately five hundred miles. Since March 23, 1923, there has been a tax of 1 cent on gasoline sold in the state, the proceeds of which go to the State Highway Department to be expended on road maintenance; this is in addition to another 1 cent tax, the proceeds of which go to the counties for maintenance. The activities of the State Highway Department will continue whether or not a proposed bond issue of \$60,000,000 is authorized by the vote of the people in 1924. Demand for motor trucks in 1924 will probably be about the same as for the present year. Ford 1-ton trucks are much in evidence in this state.—Chas. H. Moorefield, State Highway Engineer.

#### STATE OF OKLAHOMA

275 miles of Federal-aid work under contract at present which should be completed in 1924. There are 196 miles of the remainder of the Federal-aid projects, to be let during 1924. Since the initiation of the Federal-aid program 565 miles have been completed. Besides the above, there has been constructed without Federal-aid 305 miles. In 1924, without Federal-aid, hard-surfacing

will progress in Oklahoma, Tulsa, Carter, Mayes, Okmulgee, Muskogee, Kay, Counties, Osage, etc., which may pave over 60 miles more of state road. There is no State-aid in Oklahoma and Federal-aid is limited. Funds have been provided by county bond issues and county revenue. Funds for the work to be done in 1924 have already been provided. In 1924, in addition to the foregoing, new road work may be initiated in Rogers County, which has just voted a \$600,000 bond issue, in Stephens County which has \$350,000 bond issue funds remaining, in Pittsburgh County which has \$200,000 bond issue funds left, in Murray County, \$75,000 in Bryan County \$190,000, LeFlore County, \$350,000 and Carter County, 300,000. Besides, bond issues for road and bridge construction to the extent of \$10,100,000 are being agitated in 11 out of 19 Oklahoma Counties. Increasing oil and agriculture activities make more urgent the demand for hard-surfacing.

There seems to be a steady market in Oklahoma for road-building equipment of all kinds. The five-ton motor truck seems to predominate.—Frank Hermann, Division Engineer.

#### STATE OF OHIO

\* \* \* will probably build, under contract, about 700 miles of permanent construction and 400 miles of gravel or traffic-bound stone construction, the latter with state forces. The funds for maintenance and repair in this state are derived from the automobile license fee, and amounts to about \$4,500,000 annually. Construction projects are financed jointly by the State Highway Department and the local counties. The state's share is derived from an appropriation made by the legislature amounting to \$9,200,000 for a two-year period, and from the Federal-aid, which is about \$2,800,000 annually. The county's share is raised by a tax levy or bond issue, and is assessed against the property owners, the township and the county in general. The four-ton capacity is favored for the heavy truck. A great many Ford and other light trucks are also used for hauling batches to concrete mixers.—G. F. Schlesinger, State Highway Engineer.

#### PENNSYLVANIA STATE HIGHWAY DEPARTMENT

Our present program, exclusive of such projects as may be authorized when money becomes available from the fifty million-dollar bond issue, which was voted by the people recently, includes 275 miles of new construction, and we will have left over approximately 80 miles of construction on present contracts which cannot be completed this year. The 275 miles of construction on the Primary System consists of 62 projects. No special appropriations have been made by the legislature of Pennsylvania for road maintenance as the revenue from motor license fees is available for this purpose. There will also be approximately 250 miles of State-aid work placed under contract next year and there will probably be some county 100 per cent work which will be contracted for but constructed under the jurisdiction of this department. All forms of motor trucks are used by contractors in Pennsylvania; for heavy haulage the 5-ton truck seems to be the favorite; and for the hauling of construction materials to mixers, the trucks used vary from one to five-ton jobs.—H. E. Hiltz, Deputy Engineering Exec.

#### STATE OF CONNECTICUT

The maintenance of state roads both trunk line and State-aid is financed from automobile revenues. No special appropriation is

made for this purpose. Originally there were definite appropriations both for trunk lines and State-aid work. There are no bond issues for road construction in Connecticut.—C. G. Nichols, Chief Clerk.

#### NORTH DAKOTA STATE HIGHWAY COMMISSION

Our plan for next year contemplates the construction of approximately 500 miles of earth grade and 200 miles of gravel surfacing.

Our state has no special appropriation for road maintenance. Our 1924 program does not depend upon the approval of any bond issues.

We have no doubt that the contractors in this state will be in the market for considerable new equipment next year. From our observation we believe that the contractors in this state favor motor trucks of from 1½ to 3-ton capacity.—C. A. Myhre, Asst. Chief Engineer.

#### STATE OF RHODE ISLAND

We expect to construct approximately fifty miles of road during 1924. Our state has made no special appropriations for road maintenance. Maintenance is covered by fund secured from the registration and licensing of motor vehicles. Activities for 1924 in no way depend upon approval of bond issues. \* \* \* believe that the 2-ton and 3-ton motor trucks are favored by contractors.—I. M. Patterson, Chief Engineer.

#### THE COMMONWEALTH OF MASSACHUSETTS

Road building program for 1924 not complete, but average construction each year is in the neighborhood of 150 miles, and it is probable that the department will construct at least this amount of mileage in 1924. Road funds are secured from motor vehicle fines and fees, and contributions from municipalities and counties. Our activities for 1924 do not depend upon the approval of any bond issue. \* \* \* contractors favor motor trucks of 1, 3, and 5-ton capacity.—A. W. Dean, Chief Engineer.

#### COMMONWEALTH OF KENTUCKY

Approximately 300 miles of road including grade and drain only, will be constructed in this state during 1924. \* \* \* no special fund for maintenance in Kentucky. It is the custom of the State Highway Commission to set aside the estimated amount necessary for maintenance at the beginning of each fiscal year.

The Good Roads Association of Kentucky is promoting a \$50,000,000 bond issue for the purpose of building roads. This will be presented to the legislature of 1924. \* \* \* estimate of contractors needs can be obtained from the Kentucky Highway Contractors' Association, Court Place, Louisville, attention D. R. Lyman, Secy. For transportation of materials for a considerable distance, the 5-ton truck has been popular; while for hauling batches on concrete work, one to three-ton trucks are being used.—J. T. Madison, Office Engineer.

#### INDIANA STATE HIGHWAY COMMISSION

1924 program approximates 400 miles of hard-surfaced pavements, and approximately 100 miles of the non-rigid types, such as macadam and gravel. No special appropriations are made for road maintenance. We have but one fund which is available for

either maintenance or construction at the discretion of the Commission.

Activities for 1924 are not dependent upon the approval of any bond issues. Funds are derived from a two-cent gasoline tax and automobile license fees. Since our program will be double that undertaken in any previous year, we will undoubtedly have numerous new contractors in the field, and for that reason, it is quite likely that many of them will be in the market for new equipment. Practically all of our contractors use a one-batch truck, that is a truck which will handle one six-bag batch of a 1:2:3 proportion. We do not permit the use of any truck over our finished subgrade, which makes a depression of over two inches. This means the use of lighter trucks equipped with pneumatic tires.—C. Gray, Chief Engineer.

#### STATE OF ALABAMA

We expect to build approximately 100 miles of new road next year. There will possibly be a greater mileage than this but our plans for the coming year have not yet fully matured. The state does not make any special appropriations for road maintenance except that part of the Automobile License Fund is used for maintenance. We have at present approximately 400 miles of road under maintenance and last year spent approximately \$55,000 for maintenance. Our activities for 1924 do not depend on the approval of any bond issues. The state has a \$25,000,000 bond issue already approved, \$6,000,000 of which has been awarded.

We do not think that the contractors in our state will be in the market for a great deal of new equipment. Contractors prefer small trucks, one and two-ton capacity.—R. P. Boyd, Office Engineer.

#### STATE OF NEBRASKA

Expect to build approximately 400 miles of earth and gravel roads. No special appropriation for road maintenance. Seventy-five per cent of all auto license fees collected are used for maintenance on the state highway system. Our 1924 program is to be financed by direct taxation. Contractors in this state will probably be in the market for gravel and grading machinery. 3 to 5-ton trucks are the most suitable for conditions in this state.—John R. Carnahan, Asst. Chief.

#### MISSOURI STATE HIGHWAY COMMISSION

We now have under contract nearly 1830 miles of roads. It seems probable that 800 miles of this will be carried over in the 1924 season. There will be another letting this year which will increase this mileage something over 1900 miles. In other words we will probably start the year 1924 with about 1000 miles of road under contract and not completed. There has been adopted by a vote of the people, an amendment to our state constitution, authorizing \$60,000,000 in bonds to be sold for construction of state roads. Up to date \$15,000,000 in bonds have been sold. We are at liberty to sell five millions additional in 1924. The state legislature in its last session appropriated \$3,000,000 to be used in maintaining state roads during the biennial period of 1923 and 1924. This appropriation is largely made up of the residue from the automobile license fees. \* \* \* that the present equipment of road contractors in the state will be sufficient to carry on the work for 1924. Of course replacements will have to be made for worn out machinery. In general, it may

(Continued on page 80)

# What the Truck Dealer Should Know About Asphalt Roads

By CLIFFORD SPURRIER LEE

**N**O person in this country is, or ought to be, more interested in good roads and streets than the man who sells motor trucks. No person is more vitally affected. Trucks are in daily operation on all kinds of pavements in our cities and on our rural highways and the nature of the pavement goes far indeed in determining wear and tear on tires, general repair costs and gasoline consumption. The dealer, as well as the owner, therefore, ought to take particular interest in all highway construction throughout the locality wherein the rolling stock he sells is likely to be in operation. The proper kind of a pavement will mean increased sales.

Now then, what is the proper kind of pavement for a highway over which there is heavy motor truck traffic? This subject is agitating the entire motor truck industry from the manufacturer, the automotive engineer and the dealer down to the truck owner himself. So also is it disturbing the dreams of highway officials and highway engineers. The development of the motor truck has been so rapid, that road builders have been hard put to it in designing pavements that would adequately provide for future traffic.

#### Need for Road Information

Highway design must necessarily be based upon the volume and character of traffic as well as soil and climatic conditions. This emphasizes the need of road information. No highway should go to pieces before the bond issue which financed its construction is paid off. The true purpose of an improved highway is the highest degree of transportation service at the least cost for construction and maintenance, both to the tax-paying public and the person who uses the road.

Today we see a strong tendency in the direction of restrictive legislation limit-

ing the total loads which may pass over our highways and bridges. This is due in part to the fact that many pavements laid during recent years have not been able to support heavy motor truck traffic without cracking and disintegrating. Highway engineers have been laying pavements of ever increasing thickness with added reinforcement. Notwithstanding all this, many types still do not endure as highways should endure because of their lack of resistance to the impact blows of traffic and to natural destructive agencies such as moisture and temperature which cause expansion and contraction.

#### Increase in Asphalt Paving

This subject has been carefully studied by highway engineers many of whom believe the theory that the flexible pavements, such as asphaltic concrete and sheet asphalt, more generally meet the needs of the times than those of rigid construction. The result has been a rapid increase in the yardage of new asphalt pavements constructed upon the rural highways. During the year 1922 a total of 82,000,000 sq. yd. of asphalt paving were laid in this country, an increase of nearly 100 per cent over the yardage laid in 1915. This year the demand for asphalt, according to officials of The Asphalt Association, is much greater than it was last year.

Asphalt pavements comprise about 54 per cent of all paving of the types higher than waterbound macadam in the larger cities of this country at the present time. Practically all of the most heavily travelled streets in our cities, are of sheet asphalt. Fifth Avenue has a traffic of 37,000 vehicles every twenty-four hours, including thousands of heavily-loaded, solid-tired buses. The asphalt pavement there is standing up splendidly and it is of interest to note that the longest recorded

tire life for motor buses has been obtained on this asphalt paved street.

There seems to be an unfortunate impression among those who use the highways that any black top roadster is an asphalt road. The tendency is to confuse the true asphalt type with worn macadam and gravel which have been surface treated with road oils and tars.

#### On Babylonian Roads

Almost as far back as our knowledge of ancient civilization extends authentic evidence exists that asphalt was known by the human race for its useful and valuable properties. Its earliest recorded use was by the Sumerians, a people inhabiting the Euphrates Valley prior to the ascendancy of the Babylonians. It was found in small pools and springs. Some of the oldest relics which have been unearthed recently by archaeologists, demonstrate that as nearly as 3000 B. C., this asphalt was used by the Sumerians as a cementing medium or binder for attaching small objects or ornaments to sculptures, carvings and pottery. Asphalt was also mixed with clay to form a dense mastic which could be moulded or carved into various forms. Such a mastic cast in the form of a heraldic device excavated at Lagash near the mouth of the Euphrates, dates back to 2850 B. C. And as early as 2500 B. C. the Egyptians utilized liquid or melted asphalt as a preservative coating for the cloth wrapping of mummies.

As a mortar for brick, asphalt was used in the construction of the Tower of Babel, for the Book of Genesis states that "slime had they for mortar" and the word "slime" is translated as "bitumen," or asphalt, in the Vulgate.

Nearly a thousand years elapsed before the use of asphalt in highway construction apparently suggested itself. It was Nabopolassar, King of Babylon, who first used asphalt as a filler or mortar for



Left: Asphalt Highway. Right: Dumping Hot Asphalt Surface Mixtures From a Five-Ton Truck

brick pavements. His son, Nebuchadnezzar, continued this practice as is proved by an inscription found on a brick taken from one of the streets. This inscription in part reads as follows:

"Nebuchadnezzar, King of Babylon, he who made Esaglia and Ezida glorious, son of Nabopolassar, King of Babylon. The streets of Babylon, the procession street of Nabu and Marduk, my lords, which Nabopolassar, King of Babylon, the father who begot me, has made a road glistening with bitumen and burnt brick." \* \* \*

Nebuchadnezzar also used asphalt extensively as a mortar in the construction of brick walls and foundations which were subjected to water action. Similar use was made of asphalt in the ancient city of Media.

In the Western Hemisphere asphalt was also known and used in ancient times by the Incas of Peru, who established a magnificent system of highways. It is stated that "some of the highways were paved with a substance not unlike bituminous macadam" — undoubtedly asphalt. Certainly natural deposits of asphalt were known by the most primitive peoples for they existed in many parts of the world and antedated the earliest known races of humanity. This is attested by the remains of prehistoric animals which some of the deposits have been found to contain.

#### Natural Asphalt

A number of theories have been advanced by noted scientists on the origin of asphalt as it occurs in nature, but all of them establish the fact that in its production, petroleum plays the part of parent. In fact, the natural transformation of petroleum into asphalt is today taking place in plain view in certain localities. Petroleum which is capable of producing asphalt is known as "asphaltic petroleum" and actually contains a substantial amount of asphalt dissolved in light oils, just as glue may be dissolved in water.

Seepages of such petroleum through the earth's crust to its surface and accumulations of these seepages in natural depressions have produced asphalt deposits, through the gradual evaporation of the lighter solvent oils. A few years ago an oil company operating in Mexico had an over-production of petroleum from some of its large wells. To save the material about twenty-one million gallons were impounded in a nearby valley and three years later, through natural evaporation, this petroleum lake had been transformed into a mass of soft asphalt.

With the growth of the petroleum industry and the increased demand for as-

phalt for highway construction petroleum refiners learned how to produce asphalt of the highest grade from asphaltic petroleum. The first commercial asphalt thus produced was manufactured from California petroleum and was known as "petroleum asphalt" to distinguish it from asphalts produced in nature. After a comparatively short period of experimental refining, it was found that high grade asphalt could be successfully manufactured from Mexican petroleums and that the purity and consistency of such asphalt could be scientifically confined within very narrow limits. So, by a single operation asphalt suitable for any desired use is now produced, which explains the increasing demand for its use in highway construction. Today about 80 per cent of all the asphalt used in this country is recovered from petroleum obtained, to a large extent, in Mexico where there seems to be an exhaustible supply.

Now asphalt paving is, in general, a combination of sand, gravel or broken

tioned, vary principally in the matter of consistency or hardness, which is gauged by the distance that a standard weighted needle will penetrate into the substance at a standard temperature during a period of five seconds. The depth of penetration is measured in hundredths of a centimeter, which unit is used to designate the exact consistency of the asphalt. Thus a 50 penetration asphalt is one in which the needle penetrates to a depth of 50 units. Asphalt of 100 penetration is a softer grade because under the same conditions of test the needle will penetrate it for a depth of 100 units. Asphalt for paving work is now commonly purchased on the basis of the penetration test as a means of selecting and controlling the proper consistency for any given type of pavement under known climatic and traffic conditions.

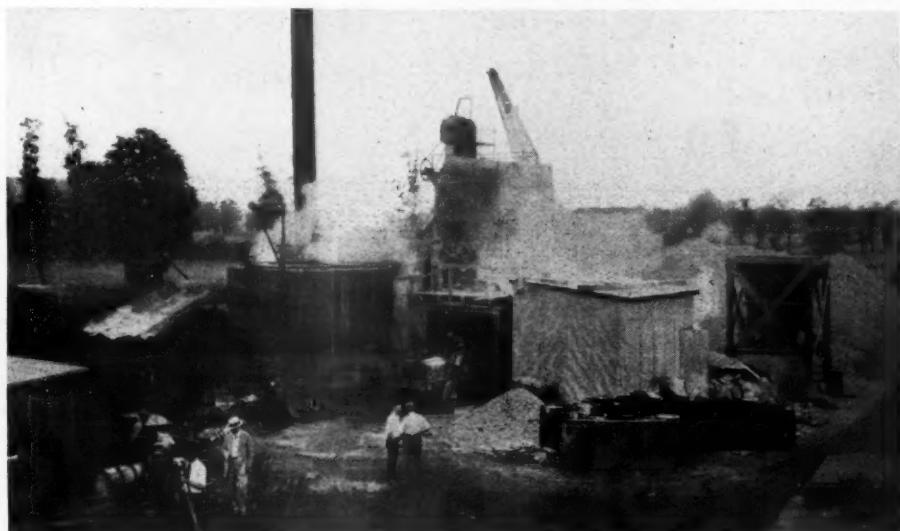
At the present time there are no other classes of pavements which are subjected to such rigid and scientific control as those involving the use of asphalt as a binder.

Any rational design of highways should take into account the fact that the subgrade must ultimately take the weight and shock of traffic as transmitted through the pavement. Practically any reasonable dry subgrade will do this if it is compacted and its surface is protected from displacement. Careful attention to subgrade preparation and drainage is, therefore, the first essential to be considered.

It is manifestly uneconomical, if not impracticable, to adopt a design of highway which will permanently bridge appreciable areas of weak subgrade. While asphalt develops bridging action to an appreciable extent it will of itself constantly seek to maintain contact with the subgrade at all points and thus reinforce itself with the maximum supporting value of the subgrade. Both the service history of asphalt base pavements and the test data indicate that under given conditions it is not necessary to adopt as massive a design for the flexible type of base as for rigid type. It is difficult for engineers who have had no opportunity to observe the asphalt base pavement under heavy truck traffic to think of it in terms of less thickness than the rigid base but in the light of present experience such consideration appears to be entirely warranted.

Under heavy motor truck traffic impact is the most destructive traffic element to which a road or pavement is subjected. Modern roads and pavements are subjected to impact. To prove serviceable they must be designed successfully to resist impact.

(Continued on page 76)



Asphalt Plant in Operation, Heating Asphalt and Mixing Preparatory to Laying

stone mixed with asphalt as a binder, or cement, to hold the other ingredients firmly together. The asphalt also serves as a waterproofing medium for the entire pavement structure and usually constitutes from six to twelve per cent of the whole. There are three principal types of pavements in which asphalt is used for this purpose. They are:

1. Sheet asphalt pavement. This type is a mixture of asphalt with carefully guarded sand and fine mineral filler, such as limestone dust.

2. Asphaltic concrete. This is a mixture of asphalt with broken stone or slag and often with sand and mineral filler as well. Some mixtures of this type are compressed to produce asphalt blocks, which are laid in regular courses as in brick pavement construction.

3. Asphalt macadam. This is a broken stone structure bound together with asphalt that is poured hot over the surface and into the interstices between the stone fragments during construction.

Asphalts, for the types of highway men-

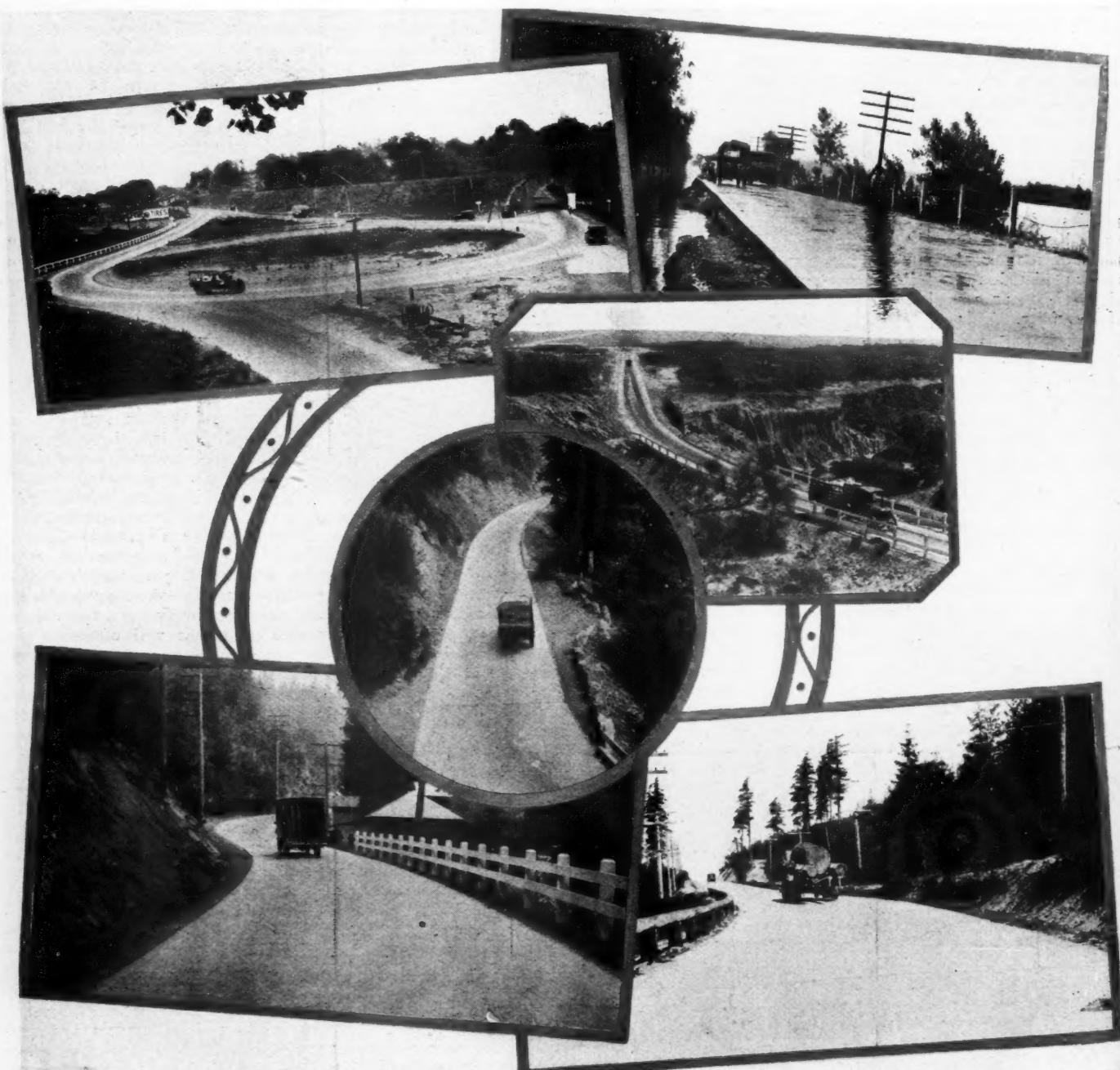
# The Motor Truck is Working Out of the Hole

By W. M. KINNEY, General Manager Portland Cement Association

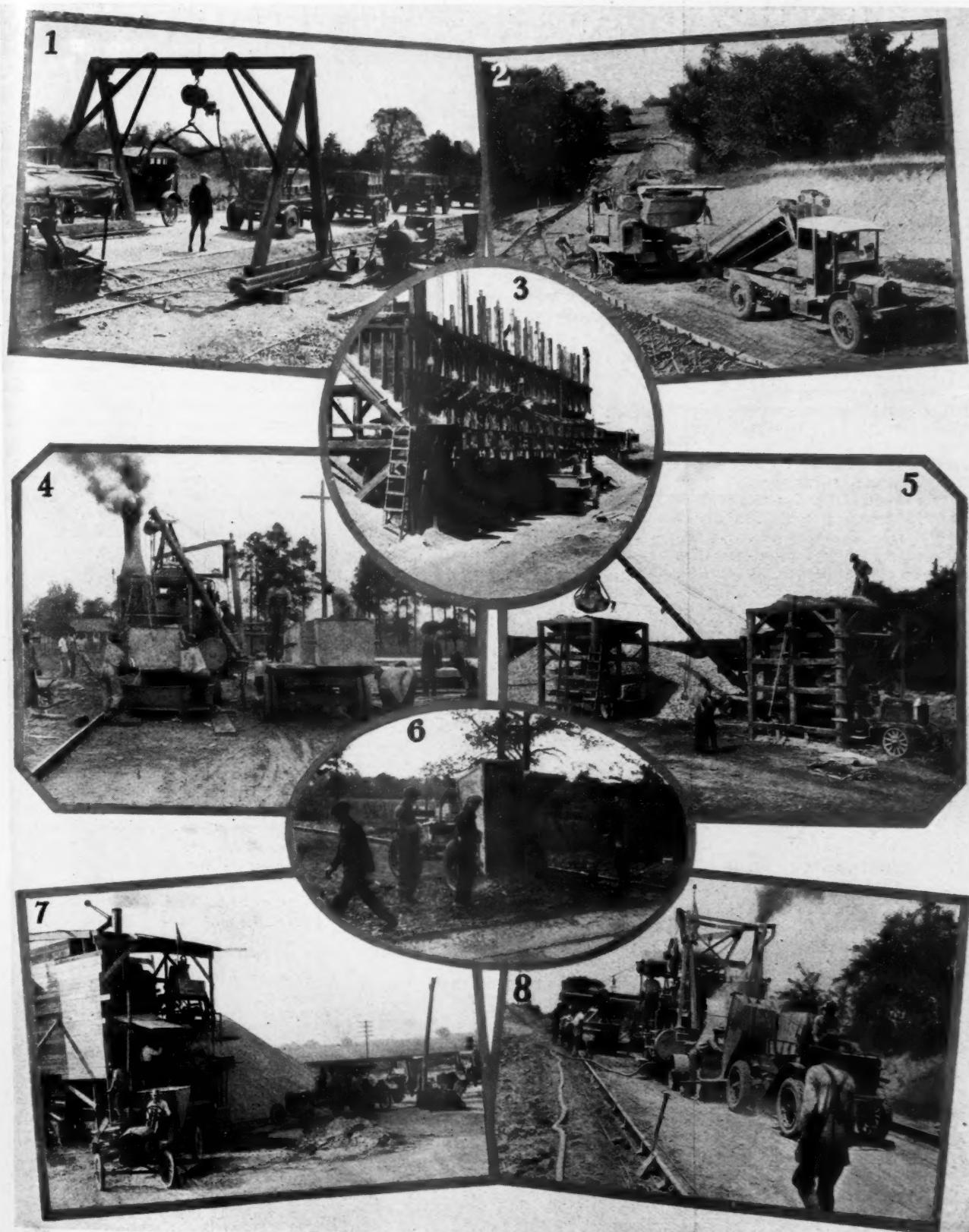
**M**ORE than six thousand miles of new concrete roads are now being placed at the service of American commerce **every year**. This represents an annual investment of more than \$200,000,000. These figures seem large only because they represent a new activity. To get a clear mental picture of their meaning, think of the truck you first saw, about twelve or four-

teen years ago. About 1911, the country was producing only 10,000 trucks a year. Now you can name fifteen cities, each of which has more than 10,000 trucks owned and operated within its limits **and adjacent highways**. Also in 1911 it was almost impossible to take a truck outside of a city, partly because the roads were not good enough, partly because the trucks were not good enough!

The motor truck was improved first. As its usefulness became apparent, the manufacturers gave their attention to producing a vehicle of rugged design and with sufficient power to negotiate almost any country road. This proved to be very bad for the road, and there ensued great volumes of conversation and reams of print as to just what we were going to do about it. The improvement and ex-



Today Good Roads Reach Out to Every Section of the Country



**Modern Concrete Road Construction Requires Equipment of Many Descriptions. Specialized Equipment is Largely Responsible for the Remarkable Progress Achieved in Road Construction the Past Five Years**

1. Transfer crane for lifting batch boxes from trucks to industrial railway. 2. Four-batch separate compartment, truck body which discharges one after the other into the mixer skif. 3. Dump trucks at Central mixing plant. 4. Dumping mixed concrete which has been hauled several miles. 5. Portable bins and crane for loading trucks from stock pile. Note the 3½ ton Master in front and the 2 ton Autocar under the second bin. 6. Discharging batches of wet aggregate at point of construction. 7. A large loading, or central proportioning plant, for loading trucks. 8. Autocar truck with two batch special body dumping directly into mixer skif.

tended sale of the truck was a matter of private enterprise. The improvement of the roads and their extensions into connecting highways was a matter of public enterprise. History, as usual, repeated itself, and private enterprise outstripped that of the public by several years.

Transportation experience of the war years proved that it would take more than conversation to make the roads over into modern commercial highways, and the years 1918 and 1919 saw several states and minor governmental units undertake construction of durable highways on something approaching an adequate scale.

Prior to this time there were a few outstanding examples of durable road construction by pioneers in this modern field. By 1918, Wayne County, Michigan—the home of the motor industry—had completed nearly 150 miles of concrete. Milwaukee County, Wis.; Vermilion County Ill.; Cuyahoga County, Ohio; Suffolk County, N. Y.; Huron County, Ohio; Snohomish and King Counties, Wash.; Stanislaus County, Cal.; and a few others, were setting the pace for the rest of the country. Concrete roads proved their durability and suitability for motor vehicle traffic in these scattered examples of community road improvement. As always, there were many ultra conservative prophets who did not hesitate to proclaim the concrete road at best a doubtful experiment; they insisted it was too hard, it would crack, it would "dust," or a host of other things would cause early failure.

Fortunately concrete proved impervious to the weather, the traffic, and criticism alike. When honestly built, it continued to serve traffic as well or better than many types of construction much longer known to highway builders. Truck owners and motorists soon realized that the concrete roads "stayed on the job" even though the early examples had many faults of construction or design.

#### Truck an Important Unit

Progressive constructors were quick to adopt the motor truck as a road-building tool. The early makeshifts of 1910 and 1913 were replaced by trucks specially designed for contractor's service. It was found that the truck could do any kind

of hauling formerly done by horses, and do it quicker and cheaper. It was as useful in the preliminary grading operations as in the work of laying pavement.

Formerly a contractor seldom thought of using a steam shovel on heavy grading or in a gravel pit unless he was justified in laying a railway track to serve the shovel. A steam shovel is one of the greatest labor-saving devices for contractors ever invented. It has been modified and specialized in recent years and can be obtained in sizes which will handle shallow cuts or deep excavation with the greatest facility. Almost every time you see a steam shovel at work you will also see a string of sturdy motor trucks. The trucks and the shovel are almost inseparable in road building.

#### "Pavers" of Any Capacity

Concrete mixers have been specialized for concrete road work, and these are called "pavers." The paver is rated according to the capacity of its "drum," in which the materials are mixed. The smallest mixer commonly used turns out a "two-sack batch" of concrete. This means a mixture of two "sacks" (1 sack equals 94 lb. or 1 cu. ft.) of portland cement, 4 cu. ft. of sand, 6 cu. ft. of stone, and 12 gal. of water. Such a "batch" weighs about 1300 lb. and yields about 8 cu. ft. of concrete. This is enough to lay about 1 1/3 sq. yd. of pavement 8 in. thick. From this small paver, there are others ranging up to a mammoth machine turning out a "ten sack batch," which requires over two tons of material for a single charge. This produces enough concrete for 6 2/3 sq. yd. of 8-in. pavement, or more than 3 linear ft. of pavement 18 ft. wide.

#### Trucks Supply Mixers

Whatever the capacity of the paver may be, it must have a constant supply of cement, sand and stone, or it can produce no concrete. There must be a regular movement of materials to the mixer. In some cases, sand and stone is placed in storage piles directly on the subgrade, which is leveled and rolled in advance. In other cases, huge stock piles are made near the point where the materials are

received by rail shipment. Again, material may be hauled directly from the pit or quarry to the mixer. By any method, the motor truck does most of the hauling. When the road is completed, the truck's job is not done; it then may be turned into local commercial service transporting commodities or produce over the pavement it has helped to build, between farm and market, or from factory to railway.

Illinois has completed 1000 miles of standard concrete road this year alone. Indiana, Michigan, New York, North Carolina, Ohio, Pennsylvania and Wisconsin are each building from 200 to 350 miles of new concrete. New Jersey, Delaware, Maryland, Virginia and Washington are each completing one hundred miles, or more, this year.

Many states are now receiving proposals for concrete roads which will be built next year. Taking proposals and awarding contracts during the fall and winter permits the contractor to assemble his equipment, store materials, and so plan his operation as to take the utmost advantage of the working season. When spring comes, and the weather permits concrete laying, the motor truck is the first bit of equipment to turn a wheel—or perhaps its wheels have been turning all through the winter months!

Thus the motor truck has worked itself out of the hole. Instead of being confined to the city streets, a truck may go from Chicago to St. Louis, Cleveland, New York, Baltimore or Oshkosh, without once leaving the pavement. There are comparatively few miles remaining unpaved—and 90 per cent of the pavement is concrete—on the Pacific Highway from San Diego north through Los Angeles, San Francisco, Medford, Portland, Seattle to Vancouver, B. C. Such long trips as these are possible; but it is in the rapidly increasing network of concrete roads of short lengths that offer the best field for truck hauls. Nearly half a million trucks are on the farms of the country.

We cannot now foresee when man will not need a wheeled vehicle and a suitable roadway for his transportation. Roads must be built, widened, and renewed; trucks must be worn out and replaced in building the roads and in hauling over them; so we cannot yet look forward to the time when we can look at a map and say of our highway system, "It is done."

#### Concrete Paved Rural Highways Built or Replaced Under Contract to November 1, 1923

State	Roads Mileage—18-ft. Pavement	State	Roads Mileage—18-ft. Pavement	State	Roads Mileage—18-ft. Pavement
Alabama . . . . .	40	Maryland . . . . .	890	Pennsylvania . . . . .	2,160
Arizona . . . . .	396	Massachusetts . . . . .	196	Rhode Island . . . . .	45
Arkansas . . . . .	218	Michigan . . . . .	1,572	South Carolina . . . . .	134
California . . . . .	3,284	Minnesota . . . . .	481	South Dakota . . . . .	11
Colorado . . . . .	163	Mississippi . . . . .	190	Tennessee . . . . .	121
Connecticut . . . . .	264	Missouri . . . . .	410	Texas . . . . .	420
Delaware . . . . .	302	Montana . . . . .	27	Utah . . . . .	232
District of Columbia . . . . .	8	Nebraska . . . . .	58	Vermont . . . . .	13
Florida . . . . .	131	Nevada . . . . .	29	Virginia . . . . .	561
Georgia . . . . .	313	New Hampshire . . . . .	8	Washington . . . . .	986
Idaho . . . . .	36	New Jersey . . . . .	556	West Virginia . . . . .	548
Illinois . . . . .	3,203	New Mexico . . . . .	60	Wisconsin . . . . .	1,558
Indiana . . . . .	1,370	New York . . . . .	2,494	Wyoming . . . . .	13
Iowa . . . . .	467	North Carolina . . . . .	735		
Kansas . . . . .	446	North Dakota . . . . .	4	Total U. S. . . . .	27,409
Kentucky . . . . .	146	Ohio . . . . .	1,494	British Columbia . . . . .	31
Louisiana . . . . .	14	Oklahoma . . . . .	336		
Maine . . . . .	64	Oregon . . . . .	202	Grand Total . . . . .	27,440

#### Brake Lining Association Holds Interesting Meeting

Addresses dwelling on the work of the Bureau of Standards and exhibitions on the new apparatus were the features of the gathering called by the Asbestos Brake Lining Association, at Washington, D. C., November 21. In addition to the speeches by S. von Ammon, D. F. C. Brown and W. S. James, all of the Bureau, there were addresses by E. W. McCullough, manager of the fabricated production department, U. S. Chamber of Commerce; A. W. Koehler, vice-president of the A. B. L. A.; C. F. Harwood; Clarence Carson, chairman of the S. A. E. Subdivision on Brake Lining, and Herbert Chase of the Class Journal Co.

# Don't Conceal Your Assets; Display Them

By MARTIN J. KOITZSCH

EVERY now and then a dealer creates a window display or a floor display that is odd, different, unusual—a display that accomplishes its object. The dealer with a keen advertising sense knows that the floor display idea has not exhausted itself of the power of attraction merely because of its universal use. He is, however, constantly planning something new; something that is not obvious, or usually done. Of course, the extent of his ideas may be limited by the nature of his product.

Any line that contributes value to society has a strong attention-getting pull. If the product is such that it will not lend itself to an attractive eye-compelling

display, the up-to-the-minute dealer will devise some clever merchandizing plan to link up with it. An elaborate and highly ornamental exhibition is not the only way of gaining attention and attracting business.

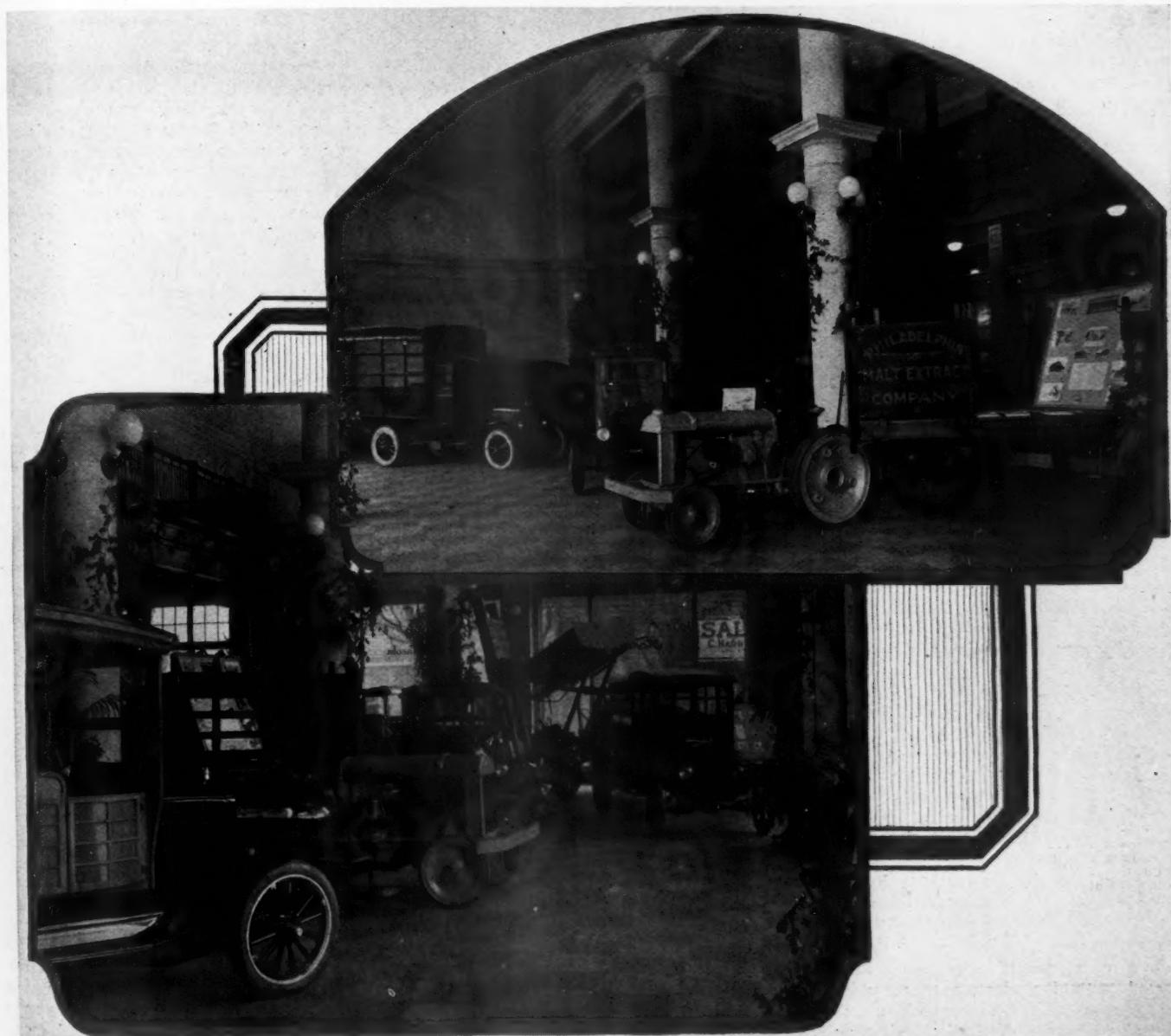
Any business man, no matter who he is so long as he is a business man, will stop and listen attentively, if first you have convinced him that your proposition possesses merit and will save him money. You must, however, first get his attention. That is the object of a display with an idea behind it.

It is self-evident that a commodity designed for commercial service has as its sole selling appeal only the elements of

money and time saving and adaptability to business. Passenger car sales talk will never sell a truck.

Using this as a basis Thomas B. Martindale, an alert Ford dealer in Philadelphia, decided to run a special commercial body display in his own building. He was determined to show his prospects in the truck market that he could accommodate them in any business field. He had on exhibition every type of body in demand today. No matter what line the prospect was interested in, he was fairly certain of seeing a job adaptable to his needs. The types on display included express, open and closed; light delivery;

(Continued on page 78)



Interior Views of the Thomas B. Martindale Commercial Body Display Hall  
Note the variety of body types on display and the attractive lay-out of units

# Route Not Road, the Electric Truck Potential

## But Good Roads Stimulate the Sale of Electric Trucks. Good Roads Increase Mileage of Electric Trucks 100 Per Cent

MANY dealers harbor the thought that the successful operating of the electric truck is limited to the type of roads found only in the larger cities such as New York, Chicago, Philadelphia, Boston, etc. This is a natural assumption, because in those cities the most electric trucks are to be found. The reason why more have been sold in the large centers is simply because of the merchandising methods which have been in existence in the electric truck field ever since its inception.

The electric truck manufacturer differs very little in comparison with his brother in the gas truck field in this respect. He usually assumed that sales resistance is less in the larger cities than in the smaller centers, no matter what the commodity. There are more potential customers, to be sure, but there is also more competition. Every truck manufacturer starts out with the same idea in mind, that the easiest way to get trucks on the street is to tackle the big cities first.

### Something to Think About

Does he appreciate also the fact, that this market is highly competitive and that many manufacturers have spent small fortunes trying to establish themselves in the large centers and have missed golden opportunities in the smaller communities?

Getting back to the electric truck manufacturers' methods, we find that he has centered his activities in the metropolitan cities in the past for another very important reason, namely, because electric current was readily available and at a reasonable figure. Furthermore, he tied up the sale of electrics with central stations' activities, because they furnished the current and consequently constituted a natural channel for sales promotion. In this way the electric truck was practically forced on the central stations and unfortunately in many cases through ill-advised application their use was not found suitable. This proved a setback to the electric truck industry, which, coupled with the general disregard for economical hauling methods during the war days, made it exceedingly difficult for the electric manufacturer to progress in that field for which the electric truck is eminently fitted—namely the transportation of commodities in short-haul, frequent-stop delivery routes.

Even now some of those intimately connected with the electric truck industry are placing too much emphasis upon the central station as the logical salesman of the electric truck, just because the latter sells "juice."

The gas truck industry might as well

look to the big oil companies to sell their product because they sell gasoline. Fortunately, there are a few electric truck manufacturers who have long since given up this idea and have decided to market their product through direct dealer representation, which is the only logical way.

Sight must not be lost of the fact that the central station can be of great assistance in advocating the sale of electric trucks, but the central station should not be expected to sell them. The central station may be depended upon to assist the cause by supplying current to the owner at minimum rates, thus helping to popularize the electric truck, because at the same time they are simultaneously helping to sell more current during the off-peak period, thereby reducing their overhead.

**Conditions are entirely different today.** The electric manufacturer fails to realize that there are over 7500 points in this country where current can be purchased at less than 5 cents per kilowatt, and it is an assured fact that these same centers now have good systems of paved roads radiating from them so that there is no limit to the number of places where electric truck operation is perfectly feasible.

Yes, there was a time when the electric truck could not cover more than 25 miles on good roads before it was necessary to recharge the battery. But those days are gone forever. There isn't an electric truck built today, thanks to the co-operation of the battery manufacturers, that cannot do 35 miles on almost any kind of dirt road before it becomes necessary to recharge the battery. And we believe this figure is conservative. We must also keep in mind that the average merchant who has use for an automotive vehicle in the short-haul, frequent-stop delivery work does not as a rule average more than 35 miles per day and consequently "speed" is not a factor. In fact the actual mileage covered per day is limited in comparison to the number of stops. It is the large number of stops in a limited mileage that makes it possible for the electric to show up a better cost record than either the horse or the gasoline truck in this type of application.

### Good Roads Felt by All

However, it is not our object here to discuss the merits of any particular type of transportation, but to show the relationship existing between the good road and the electric truck. Even on dirt roads the electric truck can make all the mileage per day that is required in short-haul, frequent-stop delivery service. Therefore, all the arguments to the effect that

the electric is only a good roads vehicle are baseless. The sooner gas truck dealers in the smaller communities appreciate this, the sooner they will see the advantages and revenue to be derived from the sale of electric trucks, in that short-haul, frequent service.

If an electric truck can do 35 miles per battery charge on dirt roads, it is evident that on the better type of roads the electric truck will perform much better than is generally appreciated. The same analogy holds good for the gas truck.

### On Power Consumption

Tests which have been made by the Engineering Experiment Station of Iowa on the effect of road surfaces on gasoline consumption are very interesting. They show that the better type of roads materially decrease the consumption of gasoline. The average results of the investigations were as follows:

	Mileage per gallon	Miles per ton miles per gallon
On earth	14.	ton miles per gallon
On gravel	21.	" "
On bitulithic	28.5	" "
On brick	29.7	" "
On concrete	31.	" "

It is logical to assume an equivalent comparative mileage per battery for electric trucks. If 35 miles per battery charge is the mileage secured on an earth road, the mileage secured on other surfaces would be as follows:

	Mileage per gallon	Miles per ton miles per gallon	Miles per Battery Charge
Earth	100	35	
Gravel	150	52½	
Bitulithic	203	71	
Brick	212	74	
Concrete	221	77½	

The same table may be used to estimate the cost of operation on the surfaces enumerated.

Does not this prove that the electric truck is a logical unit for the gas truck dealer to sell, as it is not limited by road conditions? Tremendous road building activities throughout the country have thus removed one of the obstacles confronting the electric truck industry. The electric truck can be merchandised successfully in the larger centers and in many other communities as well.

Every gas truck dealer can readily ascertain for himself from his own observations in his territory just what the road conditions are. Seldom, if ever, will he find that roads are an obstacle, and when electric power is available all that remains for him to do is to comb his territory for those prospects who are not using the proper vehicle for short-haul, frequent-stop delivery work. He will find more prospects than he ever thought existed, a virgin field for new sales effort, another business—a greater profit.

# Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

\*Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line  
Fan Belt Type: V—V-Shape, F—Flat, R—Round

NAME, MODEL AND TONNAGE	ENGINE						BRAKE LINING				FRAME								
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt		Service	Emergency		Length	Width	Over All	Clearance at Lowest Point of Chassis						
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle			
Aege 20-1.....	3	1	1	H	11	2	11	2	V	11 1/2	2 1/2	1/4	2	2	110 1/2	63 1/2	194	34	11
Aege 30-1 1/2.....	3	1	1	V	11	2	11	2	V	12	3	1/4	2	2	110 1/2	63 1/2	194	34	10 1/2
Aege 40-2.....	4	1	1	V	8	1 1/2	11	1 1/2	V	12	3 1/2	1/4	2	2	123 1/2	74 1/2	208	34	9 1/2
Aege 40L-2.....	4	1	1	V	11 1/2	1 1/2	12 1/2	1 1/2	F	13	3 1/2	1/4	2	2	123 1/2	74 1/2	214 1/2	34	10
Aege 60-2 1/2.....	4	1	1	V	11 1/2	1 1/2	12 1/2	1 1/2	F	13	3 1/2	1/4	2	2	132 1/2	79 1/2	223 1/2	34	10
Aege 60L-3.....	4	1	1	V	12 1/2	1 1/2	12 1/2	1 1/2	F	13	3 1/2	1/4	2	2	140 1/2	79 1/2	235 1/2	34	10
Aege K (Bus).....	3	1 1/2	1 1/2	V	12 1/2	1 1/2	12 1/2	1 1/2	F	15 1/2	3 1/2	1/4	2	2	220 1/2	127 1/2	312	41 1/2	6
Aege 90-3 1/2.....	4	1	1	V	10	1 1/2	12	1 1/2	F	15 1/2	3 1/2	1/4	2	2	150 1/2	95 1/2	243	36	10 1/2
Aege 90L-4.....	4	1	1	V	10	1 1/2	10	1 1/2	F	15 1/2	3 1/2	1/4	2	2	153 1/2	96 1/2	255	37	10
Aege 125-5.....	4	1	1	V	10	1 1/2	10	1 1/2	F	18	4	1/4	2	2	159 1/2	99 1/2	261	37	10
American-LaFrance 1R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	29	4	1/4	1	1	108	60	207 1/2	33	10
American-LaFrance 2R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	132	81	230 1/2	33	10
American-LaFrance 2R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	156	98	254 1/2	33	10
American-LaFrance 2R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	180	110	278 1/2	33	10
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	118 1/2	81	216 1/2	33	10
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	144	90	243 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	168	104	267 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	192	114	291 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1/2	1/2	2	2	210	125	309 1/2	35 1/2	9
American-LaFrance 3R.....	3	1 1/2	1 1/2	V	9	1 1/2	9	1 1/2	F	45	1 1								

## Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE							BRAKE LINING					FRAME					
	Piston Rings	Carburetor		Upper Hose	Lower Hose	Fan Belt		Service			Emergency		Length		Width			
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter *	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Width
Chicago C-3½	4	1/4	1 1/4	1 1/4	V	12	1 1/2	15	1 1/2	F	25	3 1/4	1/4	4	170	84 1/2	249	36 1/2
Chicago D-5	4	1/4	1 1/4	1 1/4	V	12	1 1/2	15	1 1/2	F	25	3 1/4	1/4	4	170	84 1/2	249	36 1/2
Clinton 1 1/4	4	1/4	1 1/4	1 1/4	H	11	7 1/2	14	1 1/2	F	10 1/8	1 1/2	1/4	4	112	73 1/2	207	34 10
Clinton 2	4	1/4	1 1/4	1 1/4	H	11	1 1/2	12	1 1/2	F	11 1/4	1 1/2	1/4	4	131	81	233	33 1/2
Clinton 3	4	1/4	1 1/4	1 1/4	H	11	2	19	1 1/2	F	13 1/4	1 1/2	1/4	4	166	98	270 1/2	33 1/2
Clinton 4	4	1/4	1 1/4	1 1/4	H	11	2	19	1 1/2	F	13 1/4	1 1/2	1/4	4	163	105	270 1/2	33 1/2
Clinton 5	4	1/4	1 1/4	1 1/4	H	11	2	19	1 1/2	F	13 1/4	1 1/2	1/4	4	206 1/2	115	318	38 8
Clinton 5-7	4	1/4	1 1/4	1 1/4	H	11	2	19	1 1/2	F	13 1/4	1 1/2	1/4	4	130 1/2	91	242	38 10
Clydesdale 120B-5-6	3	1/4	1 1/4	1 1/4	V	9	1 1/2	18 1/2	1 1/2	F	15 1/8	3 1/4	1/4	4	131	143		38
Clydesdale 90-3 1/2-4 1/2	3	1/4	1 1/4	1 1/4	V	9	1 1/2	14	1 1/2	F	16	3 1/4	1/4	4	143			38
Clydesdale 65EX 2 1/2-3	3	1/4	1 1/4	1 1/4	V	11	2	12	1 1/2	F	13 1/4	3 1/4	1/4	4	132			33 1/2
Clydesdale 65X-2 1/2-3	3	1/4	1 1/4	1 1/4	V	11	2	12	1 1/2	F	12	3 1/4	1/4	4	137			34
Clydesdale 42-1 1/2-2	3	1/4	1 1/4	1 1/4	V	15	2	12	2	F	11 1/4	3 1/2	1/4	4	117	95		34
Clydesdale 20-1-1 1/2	3	1/4	1 1/4	1 1/4	V	15	2	12	2	F	11 1/4	3 1/2	1/4	4	109			34
Clydesdale 18-3 1/2-1 1/2	3	1/4	1 1/4	1 1/4	V	9	2	9	2	F	11 1/4	2 1/2	1/4	4	109			34
Clydesdale 10-3 1/2-1 1/2	3	1/4	1 1/4	1 1/4	V	9	2	9	2	F	50	2	1/4	2	92 1/2	63 1/2	193	34 9
Commerce 9-1500	3	1/4	1 1/4	1 1/4	V	10	9 1/2	12 1/2	1 1/2	F	13	3 1/2	1/4	4	132	75	210	34 8
Commerce 14B-3000	4	1/4	1 1/4	1 1/4	V	10	1 1/2	15	1 1/2	F	12	3 1/4	1/4	4	108 1/2			32 1/2
Commerce 25B-5000	4	1/4	1 1/4	1 1/4	H	11	2	12	2	F	13 1/4	3 1/2	1/4	4	122 1/2			32 1/2
Concord A-2	4	1/4	1 1/4	1 1/4	H	11	2	12	2	F	13 1/4	3 1/2	1/4	4	122 1/2			32 1/2
Concord AX-2	4	1/4	1 1/4	1 1/4	H	11	2	12	2	F	13 1/4	3 1/2	1/4	4	155 1/2			32 1/2
Concord B-3	4	1/4	1 1/4	1 1/4	H	11	2	12	2	F	13 1/4	3 1/2	1/4	4	105			34
Concord BX-3	4	1/4	1 1/4	1 1/4	H	11	2	12	2	F	13 1/4	3 1/2	1/4	4	120			34
Corbitt S-1/2	3	1/4	1 1/4	1 1/4	V	8	2	14	2	F	51 1/2	2 1/4	1/4	1	138			35
Corbitt D-1 1/2	3	1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	F	51 1/2	2 1/4	1/4	1	138			35
Corbitt C-2	3	1/4	1 1/4	1 1/4	V	14	1 1/4	13	1 1/4	F	69 1/2	3	1/4	1	160			38
Corbitt B-2 1/2	3	1/4	1 1/4	1 1/4	V	13	2	14	2	F	64	2 1/2	1/4	1	160			35
Corbitt AA-5	3	1/4	1 1/4	1 1/4	V	13	2	14	2	F								
Corbitt A-4	3	1/4	1 1/4	1 1/4	V													
Day-Elder AN-1 1/2	3	1/4	1 1/4	1 1/4	V	6 1/2	1 1/4	7	1 1/2	F	10 1/2	3	1/4	4	106 1/2	62 1/2	191	35
Day-Elder BN-2	3	1/4	1 1/4	1 1/4	V	4	1 1/2	12 1/2	1 1/2	F	11 1/4	3 1/4	1/4	4	118 1/2	75 1/2	215	35
Day-Elder DN-2 1/2	3	1/4	1 1/4	1 1/4	V	10 1/2	2	12	1 1/2	F	13 1/2	3 1/4	1/4	4	122 1/2	72 1/2	212 1/2	35
Day-Elder CN-3	3	1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	12 1/2	1 1/2	F	15 1/2	3 1/2	1/4	4	123 1/2	77 1/2	216	35
Day-Elder FN-4	3	1/4	1 1/4	1 1/4	V	12 1/2	2	12	1 1/2	F	17 1/2	4	1/4	4	120 1/2	81 1/2	214 1/2	35
Day-Elder EN-5 6	4	1/4	1 1/4	1 1/4	V	10	2	8	2	F	45	2 1/2	1/4	1	116			34
Defiance B-1 1/2	3	1/4	1 1/4	1 1/4	V	10	2	8	2	F	54 1/2	2 1/2	1/4	1	120			34
Defiance 48-2	3	1/4	1 1/4	1 1/4	V	10	2	8	2	F	45	2 1/2	1/4	1	120			34
Defiance D	3	1/4	1 1/4	1 1/4	V	10	2	8	2	F	54 1/2	2 1/2	1/4	1	140			34
Defiance E	3	1/4	1 1/4	1 1/4	V	10	2	8	2	F	54 1/2	2 1/2	1/4	1	97 1/2			34
Defiance EL	3	1/4	1 1/4	1 1/4	V	10	2	8	2	F	54 1/2	2 1/2	1/4	1	120			33 1/2
Denby 31 1/2	3	1/4	1 1/4	1 1/4	V	9	2	12	2	F	41 1/2	4	1/4	2	140			34
Denby 32 1/2	3	1/4	1 1/4	1 1/4	V	8	2	12	2	F	41 1/2	4	1/4	2	140			34
Denby 35 3	3	1/4	1 1/4	1 1/4	V	13	1 1/2	16 1/2	1 1/2	F	38 1/2	1 1/2	1/4	2	108			33 1/2
Denby 27 4	3	1/4	1 1/4	1 1/4	V	13	1 1/2	16 1/2	1 1/2	F	38 1/2	1 1/2	1/4	2	140			34
Denby 210 5	3	1/4	1 1/4	1 1/4	V	14	2	15	1 1/2	F	53 1/2	2 1/2	1/4	1	121	77	215	33 9
Dependable Dispatch A-1 1/2	4	1/4	1 1/4	1 1/4	V	14	2	15	1 1/2	F	53 1/2	2 1/2	1/4	1	140	77	215	33 9
Dependable C-2	4	1/4	1 1/4	1 1/4	V	10	2	14	1 1/2	F	53 1/2	2 1/2	1/4	1	152	92	248	33 9
Dependable D-2 1/2	4	1/4	1 1/4	1 1/4	V	10	2	14	1 1/2	F	63	2	1/4	1	170			33
Dependable E-3	4	1/4	1 1/4	1 1/4	V	13	2	12	1 1/2	F	63	2	1/4	1	90	57 1/2	182 1/2	34
Dependable G-3 1/2	4	1/4	1 1/4	1 1/4	V	8	1 1/2	10 1/2	1 1/2	F	33 1/4	1 1/4	1/4	2	100			34
Diamond T-75 1/2	3	1/4	1 1/4	1 1/4	V	9	1 1/2	6	1 1/2	F	48	2 1/2	1/4	2	33	22 1/2	114 1/2	34 9
Diamond T-03 1	3	1/4	1 1/4	1 1/4	V	9	1 1/2	6	1 1/2	F	11 1/2	3 1/2	1/4	2	140			34
Diamond T-T-1 1/2	3	1/4	1 1/4	1 1/4	V	9	1 1/2	8	1 1/2	F	13 1/2	3 1/2	1/4	2	152			37
Diamond T-U-2 1/2	3	1/4	1 1/4	1 1/4	V	10	1 1/2	10	1 1/2	F	15 1/2	3 1/2	1/4	2	170			37
Diamond TK-3 1/2	3	1/4	1 1/4	1 1/4	V	10	1 1/2	21	2	F	18	4	1/4	2	140			37
Diamond T-EL-5	3	1/4	1 1/4	1 1/4	V	9	2	16	1 1/2	F	28	2	1/4	2	90	48	174	11
Diamond T-S-5	3	1/4	1 1/4	1 1/4	V	11	1 1/2	8	1 1/2	F	13	3 1/2	1/4	2	126	71	221 1/2	34 9
Dielh A	3	1/4	1 1/4	1 1/4	V	11	1 1/2	9	1 1/2	F	13	3 1/2	1/4	2	126	Opt	Opt	36
Dixon Model D	4	1/4	1 1/4	1 1/4	V	11	1 1/2	10	1 1/2	F	13	3 1/2	1/4	2	126	71	221 1/2	36 9
Dixon Model C	4	1/4	1 1/4	1 1/4	V	12	1 1/2	10	1 1/2	F	13	3 1/2	1/4	2	126	Opt	Opt	36 9
Dixon Model A	4	1/4	1 1/4	1 1/4	V	9	1 1/2	7 1/2	1 1/2	F	34 1/2	1 1/2	1/4	1	63 1/2	37 1/2	159 1/2	45 11
D-Olt	3	1/4	1 1/4	1 1/4	V	18	2	18	1 1/2	F	54	3	1/4	2	240	68	166	34 9
Dorrin K-4 2	3	1/4	1 1/4	1 1/4	V	2 1/2	1 1/2	6 1/2	1 1/2	F	13 1/2	3 1/2	1/4	2	178 1/2	130 1/2	270 1/2	36 9
Dorrin K7-3 1/2	3	1/4	1 1/4	1 1/4	V	13	2	15	1 1/2	F	15 1/2	3 1/2	1/					

## Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE								BRAKE LINING						FRAME										
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt			Service			Emergency			Length		Width					
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Width			
	Width	Width	Width	Width	Width	Width	Width	Width	Width	Width	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Width			
Garford 80-4	4	X	1 1/4	V	.....	.....	.....	.....	39	2	F	15 1/2%	3 1/4	1/8	4	15 1/2%	3 1/4	1/8	4	150	88 1/2	251	36	9 1/2	
Garford 68D-5	4	X	1 1/4	V	.....	.....	.....	.....	39 1/4	2	F	17 1/2%	4	1/8	4	17 1/2%	4	1/8	4	150	88 1/2	251	36	10	
Garford 150-A-7 1/2	4	X	1 1/2	V	.....	.....	.....	.....	11 1/2	4	F	10 1/2%	4	1/8	4	11 1/2	4	1/8	4	150	88 1/2	251	36	11	
Gary F-1-1 1/2	3	X	1 1/4	V	13 1/2	2	12	1 1/4	32	1 1/4	F	12	3 1/4	1/8	4	12	3 1/4	1/8	4	120	72	214	34	11 1/2	
Gary I-2	4	X	1 1/4	V	10	2	12	1 1/4	36	2	F	13 1/2%	3 1/2	1/8	4	13 1/2	3 1/2	1/8	4	120	76	214	34	10	
Gary J-3 1/2	4	X	1 1/4	V	13	2	16 1/2	1 1/4	86	2	F	15 1/2%	3 3/4	1/8	4	15 1/2	3 3/4	1/8	4	148	86	247	36	10 1/2	
Gary K-5	4	X	1 1/4	V	14	2	18	1 1/4	2	2	F	18 1/4	4	1/8	4	18 1/4	4	1/8	4	168	99	275	39	10 1/2	
G.M.C. K-16	4	X	1 1/4	V	8 3/4	1 1/2	8 1/2	1 1/4	33 1/2	1	R	49 1/2%	2 1/2	1/8	1	47	2 1/2	1/8	1	89	57	183 1/4	34	8 1/2	
G.M.C. K-20	4	X	1 1/4	V	10	1 1/2	9 1/2	1 1/4	38 1/4	1 1/2	R	49 1/2%	2 1/2	1/8	1	47	2 1/2	1/8	1	97	54	242 1/2	34	9 1/2	
G.M.C. K-41	4	X	1 1/4	V	10	1 1/2	9 1/2	1 1/4	35 1/2	1	R	13	3 1/4	1/8	2	13	3 1/4	1/8	2	Opt	Opt	Opt	33	9 1/2	
G.M.C. K-71	4	X	1 1/4	V	11 1/2	1 1/2	9 1/2	1 1/4	35 1/2	1	R	15 1/2	3 3/4	1/8	2	15 1/2	3 3/4	1/8	2	Opt	Opt	Opt	33	10 1/2	
G.M.C. K-101	4	X	1 1/4	V	11 1/2	1 1/2	9 1/2	1 1/4	35 1/2	1	R	17 1/2	4	1/8	2	17 1/2	4	1/8	2	Opt	Opt	Opt	38	9 1/2	
Graham Bros.	3	X	1 1/4	V	9	1 1/2	7 1/4	1 1/4	34 1/2	1	F	50	2 1/2	1/8	2	20	1 1/2	1/8	2	98	58	194 1/4	33	8	
Gramm-Pioneer 10 Speed-1	3	X	1 1/4	V	12	2 1/2	14 1/2	2	29	1	F	48	2	1/8	2	26	2	1/8	2	97	54	180	30	10	
Gramm-Pioneer 15 1/2-2	3	X	1 1/4	V	10 1/2	2	6	2	39	1 1/4	F	19 1/2	1 1/4	1/8	4	19 1/2	1 1/4	1/8	4	120	74	205 1/2	32	.....	
Gramm-Pioneer 65 1/2-2	3	X	1 1/4	V	10 1/2	2	6	2	39	1 1/4	F	8	2	1/8	2	45	2	1/8	2	126	74	205 1/2	32	.....	
Gramm-Pioneer 125-2	3	X	1 1/4	V	11	1 1/2	9	1 1/2	33 1/2	2	F	22 1/2	2 1/2	1/8	4	22 1/2	2 1/2	1/8	4	129 1/2	81 1/2	226 1/2	36	.....	
Gramm-Pioneer 30-3	3	X	1 1/4	V	11	1 1/2	9	1 1/2	33 1/2	2	F	22 1/2	2 1/2	1/8	4	22 1/2	2 1/2	1/8	4	129 1/2	81 1/2	226 1/2	36	.....	
Gramm-Pioneer 75P-B	3	X	1 1/4	V	11	1 1/2	9	1 1/2	33 1/2	2	F	28 1/2	2 1/2	1/8	4	28 1/2	2 1/2	1/8	4	144	87 1/2	240 1/2	36	.....	
Gramm-Pioneer 40-4	3	X	1 1/4	V	11	1 1/2	9	1 1/2	33 1/2	2	F	32 1/2	2 1/2	1/8	4	32 1/2	2 1/2	1/8	4	132	97	263 1/2	36	.....	
G.W. W. Super	3	X	1 1/4	V	8	2	13 1/2	1 1/2	40 1/2	2	F	49	2 1/2	1/8	2	47	1 1/2	1/8	2	89	72	192	32	11 1/2	
Harvey WOA-2	4	X	1 1/4	2	V	11	2	14	1 1/4	35 1/2	2	F	45	2	1/8	2	45	2	1/8	2	139	87	242 1/2	32	10
Harvey WFB-2	4	X	1 1/4	2	V	11	2	14	1 1/4	35 1/2	2	F	50	2 1/2	1/8	4	50	2 1/2	1/8	4	139	87	242 1/2	32	10
Harvey WHB-3 1/2	4	X	1 1/4	2	V	12	2	14	1 1/4	36 1/2	2	F	20 1/2	4	1/8	2	20 1/2	4	1/8	2	151 1/2	85 1/2	258 1/2	35	9
Harvey WFT-6	4	X	1 1/4	2	V	11	2	14	1 1/4	36 1/2	2	F	50	2 1/2	1/8	4	50	2 1/2	1/8	4	84	52	189 1/2	32	10
Harvey WHT-10	4	X	1 1/4	2	V	12	2	14	1 1/4	36 1/2	2	F	20 1/2	4	1/8	2	20 1/2	4	1/8	2	86	52 1/2	191 1/2	35	9
Hawkeye O.	4	X	1	V	12	2	9	1 1/4	1 1/4	1 1/4	F	48	2 1/2	1/8	2	22	2	1/8	2	Opt	Opt	Opt	35 1/2	.....	
Hawkeye K.	4	X	1	V	12	2	9	1 1/4	1 1/4	1 1/4	F	24	2 1/2	1/8	2	23	2 1/2	1/8	2	132	132	254	34	.....	
Hawkeye M.	4	X	1 1/4	V	12	2	9	1 1/4	1 1/4	1 1/4	F	26	3	1/8	2	25	3	1/8	2	154	144 1/2	226 1/2	34	.....	
Hawkeye N.	4	X	1 1/4	V	12	2	9	1 1/4	1 1/4	1 1/4	F	28	3	1/8	2	27	3	1/8	2	144 1/2	144 1/2	226 1/2	34	.....	
Hug T.	4	X	1 1/4	V	12	1 1/2	13	1 1/4	37 1/2	1 1/4	F	48	2 1/2	1/8	2	22	2	1/8	2	Opt	Opt	Opt	35 1/2	.....	
Hurlburt A1 1/2-2	3	X	1 1/4	1	.....	.....	.....	.....	22	2	F	22	2	1/8	2	23	2	1/8	2	132	132	254	34	.....	
Hurlburt B2 1/2	3	X	1 1/4	1 1/4	.....	.....	.....	.....	24	2	F	24	2	1/8	2	25	3	1/8	2	154	144 1/2	226 1/2	34	.....	
Hurlburt C3 1/2-4	3	X	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	37 1/2	1 1/4	F	26	3	1/8	2	27	3	1/8	2	144 1/2	144 1/2	226 1/2	34	.....	
Hurlburt D5-5 1/2	3	X	1 1/4	1 1/4	V	12	1 1/2	13	1 1/4	37 1/2	1 1/4	F	28	3	1/8	2	27	3	1/8	2	144 1/2	144 1/2	226 1/2	34	.....
Indiana 12-1 1/2	3	X	1 1/4	V	17	1 1/4	14	1 1/4	38 1/2	1	F	19	2	1/8	2	19	2	1/8	2	120	76	207 1/2	32	10 1/2	
Indiana 20-2	3	X	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	22 1/2	2 1/2	1/8	4	22 1/2	2 1/2	1/8	4	126	74 1/2	217 1/2	33	10 1/2	
Indiana 25-2 1/2	3	X	1 1/4	V	6	1 1/4	13	1 1/4	26 1/2	1 1/4	F	22 1/2	2 1/2	1/8	4	138	81	229 1/2	33	9 1/2					
Indiana 35-3 1/2	3	X	1 1/4	V	10	1 1/2	17 1/2	1 1/2	40 1/2	1 1/2	F	65 1/2	3	1/8	4	65 1/2	3	1/8	4	144	84 1/2	235 1/2	34	8 1/2	
Inter'l S—2000 lbs.—Sp. Tr.	3	X	1 1/4	V	9 1/2	2 1/2	17 1/2	2 1/2	30 1/2	2	F	38	2	1/8	2	36	2	1/8	2	88	88	156 1/2	34	.....	
International 21-2000 lbs.	3	X	1 1/4	V	6	1 1/2	3 1/2	1 1/2	38 1/2	1 1/2	F	43 1/2	2 1/2	1/8	4	43 1/2	2 1/2	1/8	4	126	76	205 1/2	34	.....	
International 31-3000 lbs.	3	X	1 1/4	V	6	1 1/2	3 1/2	1 1/2	38 1/2	1 1/2	F	43 1/2	2 1/2	1/8	4	43 1/2	2 1/2	1/8	4	126	76	205 1/2	34	.....	
International 41-4000 lbs.	3	X	1 1/4	V	6	1 1/2	3 1/2	1 1/2	38 1/2	1 1/2	F	50 1/2	2 1/2	1/8	4	50 1/2	2 1/2	1/8	4	111 1/2	111 1/2	216	34	.....	
International 52-Bus	4	X	1 1/4	V	9	2 1/2	14 1/2	2	.....	.....	F	10 1/2	2	1/8	2	50 1/2	2 1/2	1/8	2	118 1/2	118 1/2	216	34	.....	
International 61-8000 lbs.	4	X	1 1/4	V	9	2 1/2	14 1/2	2	.....	.....	F	50 1/2	2 1/2	1/8	2	50 1/2	2 1/2	1/8	2	118 1/2	118 1/2	216	34	.....	
International 62 Tractor Tr.	4	X	1 1/4	V	9	2 1/2	14 1/2	2	.....	.....	F	50 1/2	2 1/2	1/8	2	50 1/2	2 1/2	1/8	2	118 1/2	118 1/2	216	34	.....	
International 63-6000	4	X	1 1/4	V	9	2 1/2	14 1/2	2	.....	.....	F	73 1/2	2 1/2</td												

## Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE							BRAKE LINING					FRAME									
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt	Service			Emergency		Length	Width	Length	Width	Length	Width						
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Width					
Mason Road King.....	3	1 1/2	1 1/2	V	11 5/8	2	14 1/2	1 1/2	1 1/2	F	42 1/2	2 3/4	1	12	40 5/8	2 3/4	1	85	56 1/2	175	30	10
Master 22-13 1/2.....	4	1 1/2	1 1/2	V	13 1/2	2	12 1/2	1 1/2	30 1/2	F	12	3 1/2	2	13 1/2	2 1/2	2	Opt	117 1/2	117 1/2	34 1/2	...	...
Master 41-23.....	4	1 1/2	1 1/2	V	13 1/2	2	12 1/2	1 1/2	31	F	13 1/2	3 1/2	2	13 1/2	2 1/2	2	147 1/2	147 1/2	34 1/2	...	...	
Master 51-32.....	4	1 1/2	1 1/2	V	13 1/2	2	12 1/2	1 1/2	35	F	16	3 1/2	2	16	2 1/2	2	162 1/2	162 1/2	36 1/2	...	...	
Master 61-5.....	4	1 1/2	1 1/2	V	13 1/2	2	15	1 1/2	35	F	13 1/2	4	2	16	2 1/2	2	162 1/2	162 1/2	36 1/2	...	...	
Master 64-5-6.....	4	1 1/2	1 1/2	V	13 1/2	2	15	1 1/2	35	F	13 1/2	4	2	16	2 1/2	2	162 1/2	162 1/2	36 1/2	...	...	
Maxwell 1 1/2.....	3	1 1/2	1 1/2	V	7 1/2	2 1/2	3 1/2	2 1/2	36 1/2	F	31	1 1/2	2	24 1/2	2 1/2	2	102	102	102	36	...	
Menominee Hurryton-1.....	3	1 1/2	1 1/2	V	6	1 1/2	12	1 1/2	40	F	13 1/2	2 1/2	2	13 1/2	2 1/2	2	122 1/2	122 1/2	107	33	10 1/2	
Menominee H-1 1/2.....	3	1 1/2	1 1/2	V	3	1 1/2	3	1 1/2	37 1/2	F	47 1/2	2 1/2	2	33 1/2	2 1/2	2	146	146	146	32	10 1/2	
Menominee D-2.....	3	1 1/2	1 1/2	V	9 1/2	10 1/2	3 1/2	1 1/2	33 1/2	F	49	2 1/2	2	46	2 1/2	2	102 1/2	102 1/2	192	92	10 1/2	
Menominee HT-1 1/2.....	3	1 1/2	1 1/2	V	3	1 1/2	3	1 1/2	37 1/2	F	12	3 1/2	2	12	3 1/2	2	132	132	226 1/2	24	...	
Menominee J-3, 5.....	3	1 1/2	2	V	3	1 1/2	3	1 1/2	40 1/2	F	13 1/2	2 1/2	2	13 1/2	2 1/2	2	174	174	101 1/2	253	34	
Menominee G-3 1/2.....	3	1 1/2	2	V	3	1 1/2	3	1 1/2	37 1/2	F	69 1/2	3 1/2	2	44	2 1/2	2	246	246	246	36	9	
Moreland RR-1.....	3	1 1/2	1 1/2	V	8	1 1/2	11 1/2	1 1/2	34	F	49	2 1/2	2	46	2 1/2	2	108	56 1/2	208 1/2	34	...	
Moreland BX-1 1/2.....	3	1 1/2	1 1/2	V	8	1 1/2	11 1/2	1 1/2	34	F	12	3 1/2	2	12	3 1/2	2	108	56 1/2	208 1/2	34	...	
Moreland EX-2.....	3	1 1/2	1 1/2	V	9	1 1/2	14	1 1/2	42	F	12	3 1/2	2	12	3 1/2	2	132	132	226 1/2	24	...	
Moreland AX-3.....	3	1 1/2	1 1/2	V	9	1 1/2	13	1 1/2	42	F	13 1/2	2 1/2	2	13 1/2	2 1/2	2	174	174	101 1/2	253	34	
Moreland RX-5.....	4	1 1/2	1 1/2	V	8	1 1/2	14 1/2	1 1/2	42	F	15 1/2	3 1/2	2	15 1/2	3 1/2	2	192	192	115 1/2	271	38	
Moreland RC-Bus.....	3	1 1/2	1 1/2	H	8	1 1/2	11 1/2	1 1/2	34	F	49	2 1/2	2	46	2 1/2	2	156	100	256	34	7	
Moreland EC-Bus.....	3	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	F	13 1/2	3 1/2	2	13 1/2	3 1/2	2	152	102	254	34	8	
Moreland AC-Bus.....	3	1 1/2	1 1/2	H	9	1 1/2	13	1 1/2	42	F	15 1/2	3 1/2	2	15 1/2	3 1/2	2	171	114 1/2	271	44	7	
Nash 2018-1-1 1/2.....	4	1 1/2	1 1/2	V	3	1 1/2	7 1/2	1 1/2	36	F	49 1/2	2	2	20 1/2	2 1/2	2	104 1/2	61	193	30 1/2	9 1/2	
Nash 3018-2-2 1/2.....	4	1 1/2	1 1/2	V	3	1 1/2	....	1 1/2	44	F	50 1/2	3	2	20 1/2	2 1/2	2	118 1/2	65	207	31 1/2	9 1/2	
Nash 4017-2-2 1/2.....	3	1 1/2	1 1/2	V	7	1 1/2	....	1 1/2	44	F	49 1/2	2 1/2	2	25 1/2	2 1/2	2	117 1/2	85 1/2	202 1/2	38 1/2	14 1/2	
Nelson & LeMoon G-2.....	4	1 1/2	V	9	1 1/2	3 1/2	1 1/2	36	F	12	3 1/2	2	12	3 1/2	2	102	Opt	Opt	134 1/2	11		
Nelson & LeMoon G-3.....	4	1 1/2	V	9	1 1/2	3 1/2	1 1/2	36	F	13 1/2	3 1/2	2	12	3 1/2	2	102	Opt	Opt	134 1/2	11		
Nelson & LeMoon G-4.....	4	1 1/2	V	9	1 1/2	3 1/2	1 1/2	36	F	16 1/2	3 1/2	2	12	3 1/2	2	102	Opt	Opt	134 1/2	11		
Nelson & LeMoon G-5.....	4	1 1/2	V	9	1 1/2	2	6	2	40 1/2	F	18	4	2	18	4	2	142	94	234 1/2	34 1/2	9	
Netco DK-2.....	3	1 1/2	V	12	1 1/2	16	1 1/2	40	F	13 1/2	3 1/2	2	13 1/2	3 1/2	2	139 1/2	93 1/2	234 1/2	34 1/2	9		
Netco HL-2 1/2-3.....	3	1 1/2	V	13	1 1/2	16	1 1/2	41 1/2	F	13 1/2	3 1/2	2	13 1/2	3 1/2	2	102	74	203	34	...		
Noble A-21-1 1/2.....	4	1 1/2	V	10	1 1/2	....	1 1/2	44	F	21	2 1/2	2	43	2 1/2	2	126	80	221	34	...		
Noble B-31-2.....	4	1 1/2	V	9	1 1/2	16	1 1/2	34 1/2	F	57	2 1/2	2	57	2 1/2	2	101	207	34	...	...		
Noble D-51-2 1/2.....	4	1 1/2	V	14 1/2	2	16	1 1/2	34 1/2	F	57	2 1/2	2	57	2 1/2	2	114	218	36	...	...		
Noble E-71-3 1/2.....	4	1 1/2	V	5 1/2	2 1/2	13 7/8	1 1/2	46 1/2	F	50 1/2	2 1/2	2	50 1/2	2 1/2	2	133	62	223 1/2	33	9		
Northway B-2-2.....	3	1 1/2	V	5 1/2	2 1/2	13 7/8	1 1/2	46 1/2	F	54	2 1/2	2	54	2 1/2	2	173	92	253 1/2	34 1/2	11		
Northway B-3-3 1/2.....	3	1 1/2	V	5 1/2	2 1/2	13 7/8	1 1/2	46 1/2	F	54	2 1/2	2	54	2 1/2	2	173	92	253 1/2	34 1/2	11		
Ogden A-2-1.....	3	1 1/2	H	12	2	6	2	44	F	11	2 1/2	1	11	2 1/2	1	108	56	186	33 1/2	10		
Ogden D-1 1/2.....	3	1 1/2	V	13	2	12	2	44	F	10 1/2	3	1	10 1/2	3	1	120	...	...	33 1/2	...		
Orden E-2 1/2.....	3	1 1/2	V	10	1 1/2	14	1 1/2	30	F	52	2 1/2	1	52	2 1/2	1	144	...	...	37	...		
Ogden F-3 1/2.....	3	1 1/2	V	11	2	16	1 1/2	36	F	15 1/2	3 1/2	2	15 1/2	3 1/2	2	168	...	...	37	...		
Ogden G-5.....	3	1 1/2	V	9	2	18	2	40	F	11	6	2	25	4	2	168	...	...	37	...		
Old Reliable B-2 1/2.....	3	1 1/2	V	....	....	....	....	....	....	....	54	2 1/2	1	54	2 1/2	1	144	...	...	32	...	
Old Reliable C-3 1/2.....	3	1 1/2	V	....	....	....	....	....	....	....	60	2 1/2	1	60	2 1/2	1	150	...	...	32	...	
Old Reliable D-5.....	3	1 1/2	V	....	....	....	....	....	....	....	72	3	1	72	3	1	156	...	...	34	...	
Old Reliable K. L. M.-7.....	3	1 1/2	V	....	....	....	....	....	....	....	16	3	1	16	3	1	158	...	...	36	...	
Oldsmobile T-1.....	3	1 1/2	V	6 1/2	1 1/2	10 1/2	1 1/2	40 1/2	F	14 1/2	2 1/2	1	14 1/2	2 1/2	1	92 1/2	60 1/2	177 1/2	34	12 1/2		
Oneida B9-2.....	3	1 1/2	H	9 1/2	1 1/2	9 1/2	1 1/2	38 1/2	F	48	2 1/2	2	48	2 1/2	2	114	...	...	34	...		
Oneida C9-2 1/2.....	3	1 1/2	H	9 1/2	1 1/2	9 1/2	1 1/2	38 1/2	F	58	2 1/2	2	58	2 1/2	2	138	...	...	34	...		
Oneida D9-3 1/2.....	3	1 1/2	H	7	1 1/2	9 1/2	1 1/2	40	F	16	3	2	16	3	2	155 1/2	...	...	36	...		
Oneida E9-5.....	3	1 1/2	H	7 1/2	1 1/2	9 1/2	1 1/2	40	F	18	4	2	18	4	2	177	...	...	38	...		
Oshkosh A-2.....	3	1 1/2	V	16	2	17	2	33 1/2	F	23 1/2	3 1/2	1	23 1/2	3 1/2	1	108	75 1/2	189	34	...		
Oshkosh AA-2.....	3	1 1/2	V	16	2	17	2	33 1/2	F	23 1/2	3 1/2	1	23 1/2	3 1/2	1	144	110 1/2	224	34	...		
Oshkosh B-2 1/2.....	4	1 1/2	V	9 1/2	1 1/2	12	1 1/2	36 1/2	F	23 1/2	4 1/2	2	23 1/2	4 1/2	2	125	85 1/2	211	34	...		
Oshkosh BB2 1/2.....	4	1 1/2	V	9 1/2	2 1/2	7 1/2	2 1/2	33 1/2	F	31 1/2	1 1/2	1	31 1/2	1 1/2	1	144	104 1/2	230	34	...		
Overland 1/2.....	4	1 1/2	V	12	2 1/2	7 1/2	2 1/2	33 1/2	F	27 1/2	1 1/2	1</td										

## Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE							BRAKE LINING					FRAME									
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt	Service			Emergency		Length			Width		Black of Driver's Seat		Driver's Seat to Center of Rear Axle		Over All	Over All	Clearance at Lowest Point of Chassis
	No. per Cyl.	Width	Outlet Diameter	★ Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Thickness	No. of Pieces	Width	Length	Thickness	No. of Pieces	Black of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis	
Reynolds 23A-2...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	2	24	24	24	24	4	136	79	202 1/2	33	33	
Reynolds 23B-3...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	2	24	24	24	24	4	156	220	53 1/2	33	33	
Reynolds 23C-25-pas. Bus...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	24	24	27	24	4	123	103 1/2	224	33	9 1/2	
Rowe CDW-2...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	35	2	Opt	24	24	24	4	123	103 1/2	224	33	9 1/2	
Rowe CDW-2 1/2...	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	32 1/2	1 1/2	24	24	24	24	4	140	96 1/2	224	33	9 1/2	
Rowe GSW-3...	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2	24	24	24	24	4	146	96	230 1/2	36	9	
Rowe HW-4...	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2	24	24	24	24	2	153	107 1/2	237 1/2	38 1/2	10 1/2	
Rowe FW-5...	3	1 1/4	1 1/4	1 1/4	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2	24	24	24	24	2	128	97 1/2	170	38 1/2	9 1/2	
Ruggles 15-1/2...	3	1 1/4	1 1/4	1 1/4	V	12 1/2	2	20	2	34 1/2	1 1/2	43 1/2	43 1/2	39	1 1/2	2	153	96 1/2	55 1/2	186 1/2	34	11
Ruggles 20R-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	7 1/2	2	13 1/2	1 1/2	35	1 1/2	48	48	46	1 1/2	2	104 1/2	65	194 1/2	34	11	
Ruggles 20AR-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	7 1/2	2	13 1/2	1 1/2	35	1 1/2	47 1/2	47 1/2	33 1/2	1 1/2	2	134 1/2	75 1/2	224	34	8 1/2	
Ruggles 40-2...	3	1 1/4	1 1/4	1 1/4	V	7 1/2	2	13 1/2	1 1/2	35	1 1/2	58	58	44	1 1/2	2	134 1/2	75 1/2	224	34	9 1/2	
Ruggles 40H-2 1/2...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	37	2	19 1/2	19 1/2	19 1/2	2	4	122	72	214	34	10 1/2	
Rumely A-1 1/2...	4	1 1/4	1 1/4	1 1/4	V	10 1/2	1 1/2	10 1/2	1 1/2	37	2	19 1/2	19 1/2	19 1/2	2	4	122	72	214	34	10 1/2	
Sandow G-1...	3	1 1/4	1 1/4	1 1/4	H	9	2	7	2	38 1/2	3/4	V	22 1/2	2 1/2	1/4	4	96	205	34	10 1/2	34	
Sandow G-C-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	9	2	7	2	38 1/2	3/4	V	22 1/2	2 1/2	1/4	4	120	Opt	32	10 1/2	34	
Sandow J-2 1/2...	3	1 1/4	1 1/4	1 1/4	V	7	1 1/2	13 1/2	1 1/2	39	1 1/2	F	11 1/2	3 1/2	1/4	4	94	Opt	37	11	34	
Sandow M-3 1/2...	3	1 1/4	1 1/4	1 1/4	V	9	1 1/2	13	1 1/2	40	1 1/2	F	13 1/2	3 1/2	1/4	4	120	71 1/2	205 1/2	32	11	34
Sandow L-5...	3	1 1/4	1 1/4	1 1/4	H	9	2	7	2	38 1/2	3/4	V	22 1/2	2 1/2	1/4	4	144	109 1/2	238	35	9 1/2	
Sanford W15-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	8	1 1/2	11	1 1/2	40	1 1/2	F	22 1/2	2 1/2	1/4	4	94	97 1/2	244	35	9 1/2	
Sanford 25-3 1/2...	3	1 1/4	1 1/4	1 1/4	V	9	2	11	1 1/2	32	1 1/2	F	55 1/2	2 1/2	1/4	2	144	97 1/2	244	35	10 1/2	
Sanford 35-3 1/2...	3	1 1/4	1 1/4	1 1/4	V	9	2	11	1 1/2	32	1 1/2	F	65	2	1/2	2	144	97 1/2	244	35	10 1/2	
Sanford 50-5...	3	1 1/4	1 1/4	1 1/4	H	11	2	14	1 1/2	37 1/2	2	F	8 1/2	3 1/2	1/4	4	140	140	35 1/2	34	35 1/2	
Schacht F-2...	4	1 1/4	1 1/4	1 1/4	H	11	2	14	1 1/2	37 1/2	2	F	8 1/2	3 1/2	1/4	4	140	140	35 1/2	34	35 1/2	
Schacht F-3...	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2	13 1/2	1 1/2	39 1/2	2	F	8 1/2	3 1/2	1/4	4	140	140	35 1/2	34	35 1/2	
Schacht E-4...	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2	13 1/2	1 1/2	39 1/2	2	F	8 1/2	3 1/2	1/4	4	152	152	35 1/2	34	35 1/2	
Schacht E-5...	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2	13 1/2	1 1/2	39 1/2	2	F	8 1/2	3 1/2	1/4	4	152	152	35 1/2	34	35 1/2	
Schacht E-7...	4	1 1/4	1 1/4	1 1/4	H	10 1/2	2	13 1/2	1 1/2	39 1/2	2	F	8 1/2	3 1/2	1/4	4	152	152	35 1/2	34	35 1/2	
Selden 30C...	4	1 1/4	1 1/4	1 1/4	V	6	1 1/2	11 1/2	1 1/2	41	1 1/2	F	11 1/2	3 1/2	1/4	4	114	71	198 1/2	34	34	
Selden 50B...	4	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	14 1/2	1 1/2	40 1/2	2	F	15 1/2	3 1/2	1/4	4	136	82	227 1/2	34	34	
Selden 52...	4	1 1/4	1 1/4	1 1/4	V	11 1/2	1 1/2	16 1/2	1 1/2	40 1/2	2	F	13	3 1/2	1/4	4	240	161	295	52	34	
Selden 53B...	4	1 1/4	1 1/4	1 1/4	V	8 1/2	1 1/2	16 1/2	1 1/2	40 1/2	2	F	13	3 1/2	1/4	4	136	82	244	34	34	
Selden 70B...	4	1 1/4	1 1/4	1 1/4	V	9	1 1/2	14 1/2	1 1/2	40 1/2	2	F	15 1/2	3 1/2	1/4	4	155	91	253 1/2	37 1/2	38	
Selden 73B...	4	1 1/4	1 1/4	1 1/4	V	9	1 1/2	14 1/2	1 1/2	40 1/2	2	F	15 1/2	3 1/2	1/4	4	155	91	253 1/2	37 1/2	38	
Selden 90B...	4	1 1/4	1 1/4	1 1/4	V	7	1 1/2	16 1/2	1 1/2	40 1/2	2	F	17 1/2	4	1/4	4	153	89	256 1/2	37 1/2	38	
Service 25-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	12 1/2	1 1/2	13 1/2	1 1/2	32 1/2	1 1/2	F	20	1 1/2	1/4	4	106 1/2	65 1/2	203 1/2	32	9 1/2	
Service 33-1 1/2...	4	1 1/4	1 1/4	1 1/4	V	8	1 1/2	10	1 1/2	38	1 1/2	F	11	3	1/4	4	121	76 1/2	216 1/2	34	10 1/2	
Service 42-2...	4	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	38	1 1/2	F	11 1/2	3 1/2	1/4	4	117 1/2	81 1/2	226 1/2	34	10 1/2	
Service 61-3...	4	1 1/4	1 1/4	1 1/4	V	10	2	10	1 1/2	38	1 1/2	F	13 1/2	3 1/2	1/4	4	127 1/2	92 1/2	226 1/2	34	10 1/2	
Service 81-4...	4	1 1/4	1 1/4	1 1/4	V	10	2	11 1/2	1 1/2	40 1/2	2	F	15 1/2	3 1/2	1/4	4	144	100 1/2	245 1/2	38	8 1/2	
Service 103-6...	4	1 1/4	1 1/4	1 1/4	V	10	2	11 1/2	1 1/2	40 1/2	2	F	18	4	1/4	4	144	100 1/2	245 1/2	38	10 1/2	
Signal NF-1...	4	1 1/4	1 1/4	1 1/4	V	7 1/2	1 1/2	16 1/2	1 1/2	39 1/2	1 1/2	F	11 1/2	3 1/2	1/4	4	120	120	301 1/2	32	9 1/2	
Signal H-1 1/2...	4	1 1/4	1 1/4	1 1/4	V	10	1 1/2	13 1/2	1 1/2	41	1 1/2	F	12 1/2	3 1/2	1/4	4	120	120	301 1/2	32	9 1/2	
Signal J-2 1/2...	4	1 1/4	1 1/4	1 1/4	V	13 1/2	1 1/2	17	1 1/2	41	1 1/2	F	13 1/2	3 1/2	1/4	4	126	126	301 1/2	32	9 1/2	
Signal M-3 1/2...	4	1 1/4	1 1/4	1 1/4	V	10	1 1/2	13 1/2	1 1/2	42 1/2	1 1/2	F	15 1/2	3 1/2	1/4	4	178	178	301 1/2	32	9 1/2	
Signal R-5...	4	1 1/4	1 1/4	1 1/4	V	10	1 1/2	15 1/2	1 1/2	42 1/2	1 1/2	F	17 1/2	4	1/4	4	178	178	301 1/2	32	9 1/2	
Standard 75-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	14 1/2	1 1/2	39 1/2	1 1/2	F	11 1/2	3 1/2	1/4	4	108	62 1/2	198	32	9 1/2	
Standard 1 1/2 K-1-1 1/2...	3	1 1/4	1 1/4	1 1/4	V	10 1/2	2	14 1/2	1 1/2	39 1/2	1 1/2	F	12 1/2	3 1/2	1/4	4	108	62 1/2	198	32	9 1/2	
Standard 2 1/2 K-2 1/2-3...	3	1 1/4	1 1/4	1 1/4	V	10	2	16	1 1/2	40 1/2	1 1/2	F	13 1/2	3 1/2	1/4	4	132	83	220 1/2	32	12	
Standard 3 1/2 K-3 1/2-5...	3	1 1/4	1 1/4	1 1/4	V	10	2	16	1 1/2													

## Replacement Table—Continued

NAME, MODEL AND TONNAGE	ENGINE										BRAKE LINING						FRAME					
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt	Service			Emergency			Length		Width		Length		Width		Over All		
	No. per Cyl.	Outlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Driver's Seat to Center of Rear Axle	Over All	Over All	Clearance at Lowest Point of Chassis	
Ultimate BL3	4	1 1/4	1 1/2	V	11	2	8	1 1/4	34	2	F	17	4 1/2	1/4	2	17	4 1/2	1/4	2	192	32 1/2	32 1/2
Ultimate D-5	4	1 1/4	1 1/2	V	11	2	8	1 1/4	34	2	F	51	2 1/2	1/4	2	51	2 1/2	1/4	2	180	37 1/2	37 1/2
Union FW-2 1/2	3	1 1/4	1 1/2	V	20	1 1/4	19 1/2	1 1/2	37 1/2	2	F	26	4 1/2	1/4	1	32	3	1/4	1	133 1/2	77 1/2	224
Union H-4	3	1 1/4	1 1/2	V	20	1 1/4	19 1/2	1 1/2	37 1/2	2	F	56 1/2	3 1/2	1/4	1	32	4 1/2	1/4	1	157 1/2	84	11 1/2
Union HW-4	3	1 1/4	1 1/2	V	20	1 1/4	19 1/2	1 1/2	37 1/2	2	F	26	4 1/2	1/4	1	24	4	1/4	1	157 1/2	98	264
United H Spec.	4	1	1 1/2	H	16	2	19	2	32	1 1/4	F	49	2 1/2	1/4	2	49	2 1/2	1/4	2	192	32 1/2	32 1/2
United 30, 35, 50	3	1 1/4	1 1/2	H	7	1 1/4	13	1 1/4	34	1 1/2	F	62	1 1/2	1/4	1	58	2 1/2	1/4	1	120	33	33
United C	4	1 1/4	1 1/2	H	7	2 1/2	7	2 1/2	37 1/2	2	F	48	2 1/2	1/4	1	48	1 1/2	1/4	1	Opt	33	33
United 1 1/2	4	1 1/4	1 1/2	H	15	2 1/2	16	1 1/2	37 1/2	2	F	49	2 1/2	1/4	1	58	2 1/2	1/4	1	Opt	34	34
United 3 1/2	4	1 1/4	1 1/2	H	7	2 1/2	12	1 1/2	37 1/2	2	F	62	3	1/4	2	46 1/2	1 1/2	1/4	4	108	32	9 1/2
U.S.U.-1 1/2	3	M	1 1/2	V	11 1/2	1 1/4	11 1/2	1 1/4	33	1 1/4	F	50 1/2	2 1/2	1/4	2	21	2 1/2	1/4	2	120	34	11
U.S.N.-1 1/2	3	M	1 1/2	V	11 1/2	1 1/4	10 1/2	1 1/4	33	1 1/4	F	50 1/2	2 1/2	1/4	4	21	2 1/2	1/4	4	120	32	9 1/2
U.S.N.W.-23 1/2-2	4	1 1/2	1 1/2	H	10 1/2	1 1/4	11 1/2	1 1/4	33	1 1/4	F	62	3	1/4	4	21	3	1/4	4	144	34	11
U.S.R.-2 1/2-3	3	1 1/2	1 1/2	V	10	1 1/2	8	1 1/2	37	1 1/4	F	62	3	1/4	4	33	4	1/4	4	156	36	9
U.S.S.-3 1/2-4	3	1 1/2	1 1/2	V	9	2	13	1 1/4	38 1/2	2	F	21	4	1/4	4	168	36	10 1/2	156	36	10 1/2	
U.S.T.-5-7	4	1 1/2	1 1/2	V	15	1 1/2	8	1 1/2	37	1 1/4	F	21	4	1/4	4	21	3	1/4	4	156	36	10 1/2
U.S.S.Spec. 4-5	3	1 1/2	1 1/2	V	9	1 1/2	8	1 1/2	37	1 1/4	F	21	4	1/4	4	21	3	1/4	4	156	36	10 1/2
Vim 50-15-34	3	1							33 1/2		F	48	2 1/2	1/4	2	46 1/2	2 1/4	1/2	2	160	32	32
Walker 15												45 1/2	2 1/2	1/4	2	16	2	1/4	4	90	32	32
Walker P3 1/2												53 1/2	3	1/4	2	19 1/2	2 1/2	1/4	4	140	35	35
Walker N8												53 1/2	3	1/4	2	19 1/2	2 1/2	1/4	4	162	35	35
Walker 22												45 1/2	2 1/2	1/4	2	16	2	1/4	4	99	32	32
Walker 42												53 1/2	3	1/4	2	19 1/2	2 1/2	1/4	4	120	32	32
Walker Johnson A-2	3	1 1/2	1 1/2	V	11 1/2	2	7 1/2	1 1/4	37	1	F	12	3 1/2	1/4	2	12	3 1/2	1/4	2	117	32	32
Walker Johnson B-3	4	1 1/2	1 1/2	V	10	2	8	1 1/4	33 1/2	1 1/4	F	18	3 1/2	1/4	4	13	3 1/2	1/4	4	133	32	32
Walter S-5	3	1 1/2	2	V	10	1 1/2	18	1 1/2	39	1 1/2	F	15	2	1/4	4	57	2 1/2	1/4	2	150	36	36
Ward LaFave 2B-2 1/2-3 1/2	3	1 1/2	1 1/2	V	7						F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	137 1/2	33	33
Ward LaFrance 4A-3 1/2-5	3	1 1/2	1 1/2	V	8 1/2						F	15 1/2	3 1/2	1/4	4	18	4	1/4	4	170 1/2	37	37
Ward LaFrance 5A-6 1/2	3	1 1/2	1 1/2	V	9 1/2						F	15 1/2	3 1/2	1/4	4	18	4	1/4	4	170 1/2	37	37
White 15-Taxi	3	1 1/2	1 1/2	V	7 1/2	1	6 1/2	1 1/4	38	1 1/4	F	46	2 1/2	1/4	2	41	2 1/2	1/4	2	55 1/2	43 1/2	149 1/2
White 15-1/2	3	1 1/2	1 1/2	V	7 1/2	1	6 1/2	1 1/4	38	1 1/4	F	46	2 1/2	1/4	2	41	2 1/2	1/4	2	85 1/2	58	179
White 15-4 1/2	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	40 1/2	2	F	53 1/2	2 1/2	1/4	2	50	2 1/2	1/4	2	85 1/2	57 1/2	189
White 20-2	3	1 1/2	1 1/2	V	7 1/2	1	7 1/2	1 1/4	38	1 1/4	F	55 1/2	3 1/2	1/4	2	50	3 1/2	1/4	2	146	92 1/2	239 1/2
White 20-D-2	3	1 1/2	1 1/2	V	7 1/2	1	7 1/2	1 1/4	38	1 1/4	F	55 1/2	3 1/2	1/4	2	50	3 1/2	1/4	2	98	70	191 1/2
White 20-45-2	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	40 1/2	2	F	11 1/2	5	1/4	4	107 1/2	82	214 1/2	34	9 1/2	9 1/2	
White 50-Bus	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	40 1/2	2	F	11 1/2	5	1/4	4	107 1/2	82	214 1/2	34	9 1/2	9 1/2	
White 40-3 1/2	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	45 1/2	2	F	11 1/2	5	1/4	4	168	112	274 1/2	74	9 1/2	9 1/2	
White 40-D-3 1/2	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	45 1/2	2	F	11 1/2	5	1/4	4	164	108 1/2	267 1/2	42 1/2	13	13	
White 45-5	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	45 1/2	2	F	11 1/2	5	1/4	4	118	88 1/2	222 1/2	42 1/2	13	13	
White 45-D-5	3	1 1/2	2	V	13 1/2	1 1/2	12	1 1/2	45 1/2	2	F	11 1/2	5	1/4	4	164	106 1/2	267 1/2	42 1/2	13	13	
Wilcox AA-1	3	1										47 1/2	2 1/2	1/4	2	33 1/2	2 1/2	1/4	2	96	34	34
Wilcox B-1 1/2	3	1 1/2										47 1/2	2 1/2	1/4	2	33 1/2	2 1/2	1/4	2	132	33	33
Wilcox C-2 1/2	3	1 1/2										57 1/2	2 1/2	1/4	2	42	2 1/2	1/4	2	141	33	33
Wilcox E-3 1/2	3	1 1/2										57 1/2	3 1/2	1/4	2	42	2 1/2	1/4	2	156	33	33
Wilcox F-5	3	1 1/2										69 1/2	3 1/2	1/4	2	42	2 1/2	1/4	2	148 1/2	36	36
Wichita K-1	3	1 1/2	1 1/2	V	18 1/2	1 1/2	12	1 1/4	52 1/2	1 1/2	F	19 1/2	2	1/4	2	49	2	1/4	2	127 1/2	32	30
Wichita M-2	3	1 1/2	1 1/2	V	18 1/2	1 1/2	12	1 1/4	52 1/2	1 1/2	F	49	2	1/4	2	49	2	1/4	2	126 1/2	30	30
Wichita R-2 1/2	3	1 1/2	1 1/2	V	18 1/2	1 1/2	12	1 1/4	52 1/2	1 1/2	F	54	2	1/4	2	54	2	1/4	2	130	30	30
Wichita RX-2 1/2	3	1 1/2	1 1/2	V	11						F	54	2	1/4	2	56 1/2	2 1/2	1/4	2	152 1/2	30	30
Wichita O-3 1/2	3	1 1/2	1 1/2	V	11						F	66	3	1/4	2	66	2	1/4	2	163 1/2	36	36
Wichita S-5	3	1 1/2	1 1/2	V	11	1 1/2	11	1 1/2	40	1 1/2	F	66	3	1/4	2	56 1/2	2 1/2	1/4	2	114	34	34
Wisconsin 2 (Loganville)	3	1 1/2	1 1/2	V	12	2	34	1/4	58	1/4	V	58	2 1/2	1/4	2	56	2	1/4	2	120	32	32
Wisconsin 2 1/2 (Loganville)	3	1 1/2	1 1/2	V	12	1 1/2	10	1 1/4	40	1 1/4	V	58	2 1/2	1/4	2	48	3 1/2	1/4	4	78	223	32
Witt-Will P-2	3	1 1/2	1 1/2	V	8	1 1/2	12	1 1/4	31													

## KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional

<b>Engine:</b>	<b>Fuel Feed:</b>		<b>Rear Axle (Make):</b>	
Beav—Beaver	6	G—Gravity	Col—Columbia	
Buda		P—Pressure	Clark	
Cont—Continental		V—Vacuum	Dun—Dunkirk	
GBS—Golden, Belknap &			Eat—Eaton	
Gr-B—Gray-Beal [Swartz			Fli—Flint	
Her—Hercules			Huck—Huck	
Hin—Hinkley			IrM—Iron Mt.	
H-Sp—Herschell-Spillman			LM—L M Axle	
Lib—Liberty			Russ—Russel	
LMF—Light Mfg. & Fdy.			Sals—Salisbury	
Lyco—Lycoming			Shel—Sheldon	
Mid—Midwest			Stn—Standard Parts	
Sup—Supreme			Thom—Thomson	
Wau—Waukesha			Tim—Timken	
Wei—Weidely			Torb—Torbensen	
Wis—Wisconsin			Vul—Vulcan	
Yellow—Yellow			Walk—Walker	
<b>Valve Arrangement:</b>			Wis—Wisconsin	
D—Head & Side			<b>Rear Axle (Type):</b>	
H—Overhead			F—Floating	
L—ELL-Head			D—Dead	
S—Sleeve			½—Semi-Floating	
T—TEE-Head			¾—¾-Floating	
<b>Radiator (Make):</b>			<b>Steering Gear:</b>	
BW—B & W			CAS—C. A. S. Products Co.	
Brm—Brenem			Dit—Ditwiler	
Bus—Bush			Dod—Dodge	
Can—Candler			Gem—Gemmer	
Cor—Corcoran			Hin—Keystone Hindley	
Chic—Chicago			Jac—Jacox	
Eag—Eagle			Lav—Lavine	
EM—English-Mersick			M-P—Muncie Products	
Eur—Eureka			Ros—Ross	
Fed—Feeders			Sag—Saginaw Products Co.	
Flex—Flexo			Woh—Wohlrab	
GO—G. & O.			<b>Wheels:</b>	
Har—Harrison			Arc—Archibald	
Hoo—Hooven			AuW—Auto Wheel	
Idl—Ideal			Bim—Bimel	
Jam—Jamestown			Bet—Bethlehem	
Kue—Kuenz			Bud—Budd	
Liv—Livingston			Cla—Clark	
Lng—Long			C&M—Crane & McMahon	
McC—McCord			Day—Dayton	
McK—McKinnon Dash			Det—Detroit	
May—Mayo			Dis—Disteel	
Mod—Modine			E&O—Eberly & Oris	
Per—Perfex			Hay—Hayes	
R-T—Rome-Turney			Hoo—Hoopes Brothers	
SJ—Shotwell Johnson			Imp—Imperial	
Spar—Sparton			Ind—Indestructible	
Spec—Special			Jon—Jones	
Spli—Splitex			Kel—Kelsey	
Stn—Standard			MM—Michigan Malleable	
U. S.—U. S. Cartridge			Iron Co.	
Whe—Wheeler			Mot—Motor Wheel	
<b>Lubrication:</b>			Mun—Muncie Wheel	
FS—Force and Splash			Mut—Mutual	
F—Force Feed			Nor—Northern	
S—Splash			Pru—Prudden	
<b>Carburetor:</b>			Roy—Royer	
Bent—Bennett			Sch—Schwartz	
Bris—Briscoe Devices			Smi—Smith	
Cart—Carter			Sta—Stanwell	
Eag—Eagle			StM—St. Mary	
Ens—Ensign			Stn—Standard	
Hol—Holly			Van—Van Wheel	
John—Johnson			Wal—Walker	
King—Kingston			Way—Wayne	
Mar—Marvel			W-L—Waterhouse & Lester	
Mas—Master			<b>Rim Equipment:</b>	
Mill—Miller			Bak—Baker	
Rayf—Rayfield			Cle—Cleveland	
Scoe—Scoe			Det—Detroit	
Strm—Stromberg			Fir—Firestone	
Sheb—Schebler			Gdy—Goodyear	
Stew—Stewart			Hay—Hayes	
Till—Tillotson			Jac—Jackson	
Zen—Zenith			Jax—Jaxon	
			Kel—Kelsey	
			Mil—Miller	
<b>Gearset:</b>				
B-Li—Brown-Lipe	11			
Cott—Cotta				
Covt—Covert				
Det—Detlaff				
DG—Detroit Gear & Mach.				
Dod—Dodge				
Full—Fuller				
Hart—Hartford				
Hoos—Hoosier				
HS—Hele-Shaw				
M-E—Merchant & Evans				
Mun—Muncie				
T-D—Twin Disc				
W-Gr—Warner Gear				
<b>Final Drive:</b>				
B—Bevel Gear	16			
C—Chain				
I—Internal Gear				
P—Spur				
R—Double Reduction				
S—Spiral Bevel				
W—Worm				

# Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Preceding Table for Replacement Data. Truck Frame Dimensions Are Included in Same Table

*(Where prices are not given it is because we have been unable to get them from authoritative sources)*

\*This symbol in the wheelbase column indicates that more than one wheelbase is furnished

TRADE NAME AND MODEL	Chassis Price	Make and Model Number	ENGINE DETAILS						GEARSET	FRONT AXLE and Model Number	REAR AXLE	TIREs, WHEELS, RIMS	Front Equipment	Rear Equipment	Wheels (Make)	Chassis Weight (Dripped)	Wheelbase			
			Bore and Stroke	N.A.C.C.	Valve Arrangement	Carburetor	Fuel Feed	Generator (Make)												
<b>1000 Pounds</b>	1	Own 3 1/2x4 3 1/2x4 3 1/2x4	21.7 21 19.6	L Cor Own	Har FS Scoo FS Till	G G G G	Rm Rm Wes Wes AuL	B.B. B.B. B.B. B.B.	Own Own Own Own	Own Own Own Own	Own Own Own Own	SS Det Own Own	Tim 0-100 Tim 0-100 Tim 0-100 Tim 0-100	S B B B	16 16 16 16	3.77 3.9 3.9 3.9	12.52 13.19 13.19 13.19	M-P Own Own Own	30x3 1/2 30x3 1/2 30x3 1/2 30x3 1/2	103 100 100 100
American-LaFrance 1R	Own	Cont N	4 1/2x5	28.9	L	Bus	Strm	G	Own	Mer	Own	Own	1/2	4.5	20.1	Own	33x5*	139 1/2		
Commerce 9	Own	H-30	3 1/2x5	22.5	L	Lng	Strn	V	Own	Mer	Own	Shel 33FA500	1/2	5.73	18.3	Jao	31.00	127		
Corbit S Speed Truck	Own	Her OX	3 1/2x5	19.8	L	Own	FS	Strn	Mer	Shel	Shel	W1002	1/2	6	20.0	Ros	34.44	130		
Diamond T 75	Own	4 1/2x5	25.6	L	GO	FS	Strn	V	Own	Mer	Col 52000	1/2	5.12	18.58	Gem	33.45*	130			
Dodge Brothers	Own	730	3 1/2x4 1/2	24.5	L	McC	FS	Stew	Own	Mer	Own	5000	1/2	4.9	18.9	Own	32.44	130		
King Zeitzer	Own	1650	Cont N	3 1/2x5	22.5	L	Chic	FS	Own	Mer	Own	1216C	1/2	4.9	20.04	Gem	33.35*	124		
Perfection	Own	1246	Cont N	3 1/2x5	19.9	L	Per	FS	Own	Mer	Own	5311	1/2	5.75	22.5	Lav	25.00	128		
Rainier R-31	Own	1970	Cont N	3 1/2x5	22.5	L	Har	FS	Own	Mer	Own	1216-B	1/2	5.75	22.5	Lav	25.00	125		
Ruggles 15	Own	H-Sp. 30	3 1/2x5	19.6	L	Per	FS	Strn	Mer	Shel	Shel	6250	1/2	6.75	22.5	Jao	23.00	122		
Stoughton C	Own	1175	Own	4 1/2x5	22.5	L	Chic	FS	Own	Mer	Own	3000	1/2	5.81	19.7	Ros	24.80	131		
Vim 50	Own	995	Own	4 1/2x5	22.5	L	McC	FS	Own	Mer	Own	5058	1/2	5.87	20	Row	26.00	108		
White 15	Own	2400	Own	4 1/2x5	22.5	L	Per	FS	Own	Mer	Own	52003	1/2	5.36	18.6	Own	32.44	132		
Yellow Cab. M-22 1/2	Own	1590	Cont V-4	3 1/2x5	22.5	L	Per	FS	Own	Mer	Own	52000	1/2	4.9	16.31	Gem	33.44	124		
<b>1 Ton</b>	1	Cont N	4 1/2x5	22.5	L	GO	FS	Strn	Mer	Own	Own	1250	1/2	6.75	27	Ros	30.50	129		
AutoCar F	2200	Own 2	4 1/2x5	18	L	GO	FS	Strn	Mer	Own	Own	6250	1/2	6.75	27	Ros	30.80	97		
AutoCar G	2300	Own 2	4 1/2x5	21.6	L	GO	FS	Strn	Mer	Own	Own	2-L	1/2	6.83	33.2	Ros	30.90	20		
Avery	1525	Buda MU	3 1/2x5	21.6	L	R-T	FS	Strn	Mer	Own	Own	Turb A	1/2	6.83	33.2	Ros	30.90	20		
Belmont B	1450	Cont N	3 1/2x5	19.6	L	SUN	FS	Strn	Mer	Own	Own	1000	1/2	6.42	15.26	Lav	30.00	129		
Besserman G.	1385	Bethlehem KN	3 1/2x5	19.6	L	GO	FS	Strn	Mer	Own	Own	3070F	1/2	6.86	18.8	Lav	33.55	124		
Betts J-3	1850	J-3	3 1/2x5	22.3	L	Chic	FS	Strn	Mer	Own	Own	1250	1/2	6.86	18.8	Ros	26.50	125		
Brookway E-2	1785	Wis SU	4 1/2x5	25.6	H	GO	FS	Strn	Mer	Own	Own	5045	1/2	5.13	20.5	Gem	33.45*	130		
Casco Model A	1785	Buda WTU	3 1/2x5	22.4	L	GO	FS	Strn	Mer	Own	Own	5000	1/2	5.85	23.46	Woh	34.50	140		
Chevrolet Sup Util. Exp.	495	Own	4 1/2x5	21.6	L	GO	FS	Strn	Mer	Own	Own	52000	1/2	5.42	18	M-P	34.50	130		
Concord E	1495	Buda GBU	4 1/2x5	21.6	L	GO	FS	Strn	Mer	Own	Own	1250	1/2	5.42	18	Hay	35.00	135		
Dielh A.	1695	Cont N	3 1/2x5	19.6	L	GO	FS	Strn	Mer	Own	Own	1250	1/2	5.3	22	Ros	34.00	138		
D-Olt A-1	1695	4 1/2x5	22.3	L	Mod	FS	Strn	V	Mer	Own	Own	5542	1/2	6.42	15.66	Ros	32.00	132		
Dorris K-2	2490	Own	4 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.5	22	Woh	33.55	135		
Duplex D.	1265	Dodge	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Federal R-2	380	Cont. J-4	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Ford T.	1495	Buda WTU	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Fulton A.	1495	Buda MU	3 1/2x5	21.6	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Garford 15	1590	Own	3 1/2x5	19.6	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Gary F.	1775	Buda MU	3 1/2x5	19.6	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
G.M.C. K-16	1665	Own	3 1/2x5	19.6	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Graham Brothers FA	1265	Dodge	3 1/2x5	22.4	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Gramma-Pioneer 10-SPT	1365	Lyo CT	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Grassie-Pioneer 40	1475	Own	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Gray Hawkeye	1575	Own	3 1/2x5	21	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	5.6	18.7	Gem	33.55	135		
Independent B (Iowa)	1665	Buda WTU	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	6.13	19.2	Own	32.50	136		
Indiana Highway Exp.	1665	Buda WTU	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	6.13	19.2	Own	32.50	136		
Int'l Speed Truck S.	1665	Wau BUX	3 1/2x5	22.5	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	6.13	19.2	Own	32.50	136		
International 21	Own	Own	3 1/2x5	19.6	L	Mod	FS	Strn	Mer	Own	Own	1250	1/2	6.13	19.2	Own	32.50	136		

Keenan H.	1160	H-SP 7000	Own FS	Zen	B-Bi	B-Li 30*	Lav	Tim 1452*	Shel	Bim	Fir
King Zeitzer	1955	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Mar	Tim 1452*	Tim 1452*
Kissel Express	1585	Own 8000	22.4 L	McC	W-Gr	B-Li 30*	Lav	Tim 1452*	Spic	Tim 1452*	Tim 1452*
Krebs J.-24	1695	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Spic	Tim 1452*	Tim 1452*
Luedinghausen C.	1650	W-SP 30	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Spic	Tim 1452*	Tim 1452*
Menominee Hurryton.	1800	Her-O	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Per	Tim 1452*	Tim 1452*
Moreland R-C-Bus	2280	Wau BUX	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	US	Tim 1452*	Tim 1452*
National F.A.	1595	Cont J-4	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Det	Tim 1452*	Tim 1452*
Nelson-LeMoen G-1	1395	Cont WTU	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	C	Tim 1452*	Tim 1452*
Nobie A-75	1095	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Orden A-2	1066	Cont J-4	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Spic	Tim 1452*	Tim 1452*
Ottonnabile.	1400	Buda WTU	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Per	Tim 1452*	Tim 1452*
Parker B-23	1286	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Patriot AA (Chicago)	1350	H-SP 7000	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Mod	Tim 1452*	Tim 1452*
Rainier R-26.	2150	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Sandow G.	1695	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	TU%	Tim 1452*	Tim 1452*
Sanford W.-10	...	Cont 8-R-6	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Sigford N.F.	1095	Cont J-4	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Stevens 16.	1066	Levo	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Transport 15.	1286	Transit A.A.	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Triangle A.A.	1286	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Mod	Tim 1452*	Tim 1452*
United Highway Spec'l.	1286	H-SP 7000	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Per	Tim 1452*	Tim 1452*
Wachstein S.	2400	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Walker Johnson L.	2500	Wau BXTU	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Wichita K.	1875	Buda WTU	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	EM	Tim 1452*	Tim 1452*
Wilcox AA.	1900	Cont N	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Wisconsin A.	1750	Cont V-4	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Yellow Cab Express Ti	...	...	22.5 L	Own	B-Bi	B-Li 30*	Lav	Tim 1452*	Full	Tim 1452*	Tim 1452*
Atlas 25...	1495	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Col	Col	Opt
Autocar F.	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Del	Col	Opt
Autocar G.	2300	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Del	Col	Opt
Clinton 20'	2070	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Clydedale 10	...	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Clydedale 10A	...	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Defiance G-2...	...	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Defiance GR-2...	1485	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Denby 31...	1750	Buda MU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Dependable A-	1876	Lin 700	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Diamond T-Q3	1876	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Eagle 101...	1365	Lyco CT	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Graham-Pioneer 10 sp-T	1850	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Hurlburt 5...	1785	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Larabee-Deyo X-2...	...	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Macfar E.X.	1750	Wsu SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Master 11...	2000	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Menominee HT.	1545	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Perfection B.	1186	Wia GCU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Reo F Speedwagon	1375	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Republi Rapid Transit	1375	Own	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Ruggles 20-R...	1375	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Service 25...	1330	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Standard 76...	1495	Wia GCU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Stewart 16X...	1875	Buda WTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
U.S.G.U.	1640	Cont V-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Yellow Cab M42-i4...	...	...	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Atlas 25...	1495	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2550	Buda GTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnielader 21B...	2600	Full LTU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnielader 40G...	2600	Cont C-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Breakaway 67...	...	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Commerce 14B...	...	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 21B...	2550	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Arnleder 40G...	2600	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Attorbury 2011	2476	Cont J-4	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Autocar F...	2200	Own 2	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Available JH-14...	2460	Her O	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Bassemer H-2...	1995	Cont N	22.5 L	Own	G	ATK Dy	B-Bi	Own	Row	Col	Opt
Brierton C...	2500	Wia SU	22.5 L	Own	G	ATK Dy</td					

TRADE NAME AND MODEL	CLASSES PRICE	ENGINE DETAILS										TIRES, WHEELS, RIMS									
		GEARSET		FRONT AXLE and Model Number		REAR AXLE		Wheels (Make)		Rim Equipment		Tires, Wheels, Rims		Wheels (Make)		Studded		Front	20	21	
Clinch (Make)	Make and Model Number	Springs (Make)	Ununiversal (Make)	Location	Speeds	Final Drive	Make and Model Number	Type	Front	Rear	*Pneumatic	Dual	Solid	Classless Wheel	Studded	Wheels (Make)	Front	20	21		
<b>1½ Ton—Con'd</b>																					
Federal S-23.....	2375	Cont J-4	Own F	B.B.	Own	Rm	Eis	W	Tim 6460	W	7.25	36.25	Gem	36x31	36x5	W	3000	144			
Garford 25 B.....	1225	Buda WU	Own L	Own	Own	NE	Spn	W	Tim 6460	W	7.28	29.29	Dod	36x31	36x5	W	4000	135			
Graham Bros CA.....	1225	Dodge	Own L	Own	Own	NE	Strm	W	Own B-360	W	7.28	28	Ros	36x31	36x5	W	2910	135			
Gramm-Pioneer 65.....	1750	Cont N	Own L	Own	Own	NE	Strm	W	Own 602-8	W	7.28	28	Ros	36x31	36x5	W	3660	138			
Grass Premier 60.....	2250	Cont J-4	Own L	Own	Own	NE	Strm	W	Clark B-360	W	7.28	28	Ros	36x31	36x5	W	3860	138			
Guidler D.....	1800	Wau Y	Own L	Own	Opt	B-Li	B-Li	W	Clark	W	5.5	26	Van	32x6*	32x6*	W	3000	132			
G.W.W. Super.....	1650	Wu SU	Own L	Own	Opt	B-Li	B-Li	W	Shul 5110	W	6.18	18	Ray	34x31	34x5	W	3200	142			
Hawkeye K.....	1900	Buda WTU	Own L	Own	Opt	B-Li	B-Li	W	Shul 330	W	7.6	62	Ros	35x5*	35x5*	W	3750	149			
Hug.....	1380	Buda WTU	Own L	Own	Opt	B-Li	B-Li	W	Clark B-Spec	W	6.5	26	Day	34x5	34x5	W	2900	118			
Independent G (Iowa).....	2040	Cont J-4	Own L	Own	Opt	B-Li	B-Li	W	Col 5000	W	7.8	31.2	Lav	34x31	34x5	W	3875	142			
Indiana 12.....	2275	Wau BUX	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.8	31.2	Lav	34x31	34x5	W	4100	146			
International 31.....	2275	Own	Own	Own	Own	NE	Strm	W	Shel W-1501	W	7.8	25	Jac	36x6*	36x6*	W	3200	128			
Jumbo 15-S.....	2350	Buda WTU	Own L	Own	Opt	B-Li	B-Li	W	Col 7000	W	7.6	29	Jac	36x31	36x5	W	4170	143			
Jumbo 15-N.....	2350	Buda CTU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	30	Lav	34x4	34x6	W	4530	144			
Kearns H.....	1650	H-Sp 7000	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3000	136			
Kenneth Springfield K33.....	2700	Own AB	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3450	150			
King Zeitzer.....	2275	Buda ITU	Own L	Own	Opt	B-Li	B-Li	W	Shel W-103	W	7.7	31	5	36x31	36x5	W	4120	142			
Kissel General Utility.....	1975	Cont J-4	Own L	Own	Opt	B-Li	B-Li	W	Tim 6460	W	7.7	31	5	36x31	36x5	W	4300	140			
Krobs K45.....	20000	Own	Own	Own	Opt	B-Li	B-Li	W	Shel W-1501	W	7.7	25	Jac	36x31	36x5	W	3100	152			
Larrabee XJ.....	2465	Cont 8 R-6	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	4730	140			
Luedinghaus W.....	2490	Was BUX	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	4200	144			
Maceff LI.....	2475	Wu TAU	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3900	150			
Mack AB.....	2350	Own AB	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3320	142			
Mason Road King.....	2350	Her O	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	4300	142			
Master 21.....	2350	Buda GTU	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3285	124			
Maxwell.....	2475	Wis EAU	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	4125	132			
Monomonee H.....	2350	Wau BUX	Own AB	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3565	140			
National GA.....	2275	Cont K-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
Noire A-21.....	2350	Wu SU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	136			
Orion D.....	2375	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	136			
Parker E-24.....	2150	Cont J-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3700	140			
Rainier R36.....	2150	Buda CTU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3700	147			
Rumley A.....	1895	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
Sandford W-16.....	2275	Cont K-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3860	140			
Schaeft H.....	2350	Wu SU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	4425	147			
Selden Unit 30.....	2375	Cont J-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	136			
Service 33.....	2350	Buda GBU-1	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	136			
Sigmar H.....	2350	Cont K-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	136			
Standard 1½ K.....	1695	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
Stewart 9.....	2350	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	142			
Stoughton B-J.....	1870	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
Transport 26.....	2350	Wu SU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
Taylor B.....	2350	Buda WTU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
Ultimate A.....	2150	Buda ETU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
U.S. Express.....	2225	Cont N	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
U.S. N.....	1785	Cont CU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	141			
Velle 52.....	2800	Cont J-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	140			
Wachusetts J.....	2550	Wau V	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
Wilcox BB.....	1850	Wau Y	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
Witt-Will N.....	2450	Cont C-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3400	144			
<b>2 Ton</b>																					
Aeron K-2.....	2890	Wau Y	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3664	166			
Aero 40.....	2890	Cont K-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3433	147			
Aero 40-L.....	2890	Cont K-4	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3433	147			
Aero 40.....	1050	Wau Y	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3300	146			
Autocar Y.....	2200	Buda WTU	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3300	97			
Autocar G.....	2300	Own 2	Own L	Own	Opt	B-Li	B-Li	W	Shel 33FA560	W	7.6	31	4	36x31	36x5	W	3300	120			

2 Ton-Con'd



**2½ Ton—Con'd**

Standard 2½-3½ K's	2795	Cont K-4	4 1/2 x 5 1/2	L	Long F	Own	B-Li	B-Li 35	A	4 Spie	Am	Tim 1542B	W	Tim 6560	Day	6400 147
Standard 2½-3½ K's	2875	Cont L-4	4 1/2 x 5 1/2	L	Long F	Own	B-Li	B-Li 50	A	4 Spie	Math	Tim 1544B	W	Tim 6680	Day	6488 147
Stirling "X"	3350	Own	4 1/2 x 5 1/2	L	Own	Bus	Ful	Ful GU-7	U	4 Spie	Am	Tim 1544B	W	Tim 6680	Day	6420 156
Super Truck 50	3785	Wau FU	4 1/2 x 5 1/2	L	Chic	Own	Ful	Ful GU-7	U	4 Spie	Am	Shel D-370	W	Shel W-21	Cla	5200 156
Triangle B.	3750	Wau FU	4 1/2 x 5 1/2	L	Wau	Own	Ful	Ful GU-7	U	4 Spie	Am	Shel CC3B	W	Shel W-21	Pru	4900 150
Ultimate B.	3785	Wau FU	4 1/2 x 5 1/2	L	Wau	Own	Ful	Ful GU-7	U	4 Spie	Am	Shel D-370	W	Shel W-21	Roy	5340 154
Union FW & FI.W.	3750	Wau TAU	4 1/2 x 5 1/2	L	GO	Own	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Smi	5800 155
Union FWC (bus).	3750	Wau TAU	4 1/2 x 5 1/2	L	GO	Own	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Gdy	4700 1200
United 50.	3800	Her O	4 x 6	L	Per	FS	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Gdy	4700 166
Wachusetts L.	3800	Cont L-4	4 x 6	L	GO	FS	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Smi	5200 170
Walker Johnson B.	3800	Hin	4 1/2 x 5 1/2	L	Bus	Own	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5300 154
Walter L.	3800	Own FU	4 1/2 x 5 1/2	L	Bus	Own	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5800 165
Ward La France 2B.	3290	Own	4 1/2 x 5 1/2	L	Bus	Own	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5800 170
Wilcox CC.	3100	Cont L-4	4 1/2 x 5 1/2	L	Chi	FS	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5800 135
Wisconsin (Sup. Tract.)	3600	Cont L-4	4 1/2 x 5 1/2	L	Chi	FS	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5800 136
Witt-Will S.	2950	Cont K-4	4 1/2 x 5 1/2	L	Chi	FS	Ful	Ful GU-7	U	4 Spie	Am	R Walk 25A	W	R Walk 25A	Hoo	5000 144
<b>3 Ton</b>																
Acme K(Bus)...		Cont 6B	3 1/2 x 5	L	GO	FS	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6511S	Bim	6000 200
Acme 60-L...		Cont L-4	4 1/2 x 5 1/2	L	GO	FS	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5650 166
Autocar H...		Own	4 x 5 1/2	L	GO	FS	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5500 114
Autocar K...		3550	Own	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5600 138
Belmont F...		3500	Buda YTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	6000 160
Bethlehem H.N...		2995	Own	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5250 145
Buffalo Model Six...		3550	Her CU-3	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 180
Clinton 65...		3550	Buda ETU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Concord JL...		3550	Buda ETU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Corbit R-22...		3550	Buda HTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Day-Elder CN...		3550	Buda HTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Defiance H-2...		3550	Buda HTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Denby 35...		2975	Cont K-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Dependable E...		2950	Cont K-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Fageo...		3900	Jbau CU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Forchier E...		3550	Cont C-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
F.W. D.B...		4200	Wis A	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Gramm-Pioneer 30...		3300	Hin HA 500	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Guilder H...		3450	Buda ETU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Hurlburt B...		3150	Buda HU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
International 63...		Own	4 x 5 1/2	L	GO	FS	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Jumbo 30...		3550	Buda ETU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Macon H.I...		3600	Mid 402	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Moreland A.X...		3500	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Moreland AC-Bus		3600	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Netco HL X...		3700	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Patriot 8W...		3150	Hin 200	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Perfection D...		2875	Cont K-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Pierce Arrow XB...		3500	Own	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Pittsburgher C...		3600	Mid 402	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Republie 19...		3550	Cont K-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Reynolds 23-B...		3000	Hin 500	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Reynolds 23-C (Bus)...		3800	Hin 500	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Rowe GSW3...		4150	Wau TAU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Schacht...		3800	Wau UAU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Service 61...		3550	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Stourbridge F...		3150	Wau FU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Traffic 6000...		3145	Cont N-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Transport 65...		3800	Cont C-2	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Traylor D...		3800	Euda ETU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Ultimate BL...		3375	Wau CU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
U.S.R. RX...		3200	Wau CU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Witt-Will SS...		3250	Cont K-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
Dependable G...		3550	Wau TAU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6560	Bim	5825 170
<b>3½ Ton</b>																
Action K-4...		4150	Wau FU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 180*
Action 90...		4950	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
American-LaFrance 3R...		4200	Buda YTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Armedler KWB...		4200	Cont E-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Armedler KWC...		4200	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Attbury 22D X Short...		4375	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Attbury 22D Std...		4275	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Available JH3½...		4375	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Brockway R-5...		4175	Her MU-3	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Chicago C...		3200	Her MU-3	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Clydedale 6...		3250	Cont L-4	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am	Tim 1540B	W	Tim 6666	Bim	6000 166
Dependable G...		3550	Wau YTU	4 x 5 1/2	L	GO	Ful	Ful GU-7	U	4 Spie	Am</					

TRADE NAME AND MODEL	Make and Model Number 4 cylinder unless otherwise noted.	ENGINE DETAILS										GEARSET										FRONT AXLE and Model Number		REAR AXLE		TIRES, WHEELS, RIMS				
		Cylinder System					Governer (Make)					Gearset (Make)					Speeds (Make)					Make and Model Number		Type		Front		Rear		
		N.A.C.C.	Bore and Stroke	Valve Arrangement	Horserpower	Radiator (Make)	Centrifugal Lubrication	Fuel Feed	Carburetor	Engine Starter	Governor (Make)	Universal Motion	Locomotion	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	Spurings (Make)	Final Drive	
<b>3½ Ton—Con'd</b>																														
Diamond T-K	Hin 1500	416-512	28.9 L	GO	Own	Bos	Covt	Covt SA4	A 4	Spiric	Math	Tim 1632B	W	Tim 6666	F	8.8	44.36	Gem	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5		
Dixon A.	4070	412-512	28.9 H	GO	Own	Pier	SP	SP	A 4	Hart	Math	Tim 1632B	W	Tim 6666	F	8.8	44.36	Gem	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5		
Doris K7.	4400	412-512	28.9 H	McC	Own	G	SP	SP	A 4	Hart	Row	Tim 1630	L	Own	F	8	64	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*		
Duplex E. (t. w. d.)	4400	412-512	28.9 H	McC	Own	G	SP	SP	A 4	Hart	Row	Tim 1630	L	Own	F	8	64	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*		
Gary KT.	3060	412-512	28.9 H	Chic	Own	Eis	SP	SP	A 4	Hart	Row	Tim 1630	L	Own	F	8	75.75	2	Own	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
G.M. C. K-71A.	3060	412-512	28.9 H	Chic	Own	Eis	SP	SP	A 4	Hart	Row	Tim 1630	L	Own	F	8	75.75	2	Own	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
G.M. C. K-71B.	3060	412-512	28.9 H	Chic	Own	Eis	SP	SP	A 4	Hart	Row	Tim 1630	L	Own	F	8	75.75	2	Own	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Gramm-Bernston 70P	4225	Wau 100	41.6-51.6	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	33	Opt	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Grass Premier 90.	3700	Wau DU	41.6-51.6	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	33	Opt	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Harvey WHB.	3960	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	2	44.84	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	
Hawkeye N.	3060	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	2	44.84	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	
Indiana 35.	3060	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	2	44.84	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	
Jumbo 35.	3060	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	2	44.84	Woh	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	36x5*	
Kelly-Springfield K-41	3900	Wau DU	41.6-51.6	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	25	53.26	Lav	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Kanworth L.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	33	55.26	Lav	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
King Zeitzer.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	3	55	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Krebs L10.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	9	5	50.8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Krebs B120.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	25	55	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Lange F.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	25	55	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Larabee L-4.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	25	55	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Luederbachaus.	3625	Buda YTU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	10	25	55	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Mark AC.	4950	Wau AC.	5.6	40	32.4 L	Own	Pier	SP	A 4	Spiric	Mer	Tim 1630	L	Own	F	7	54	37	Own	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Master 51.	4950	Wau AC.	5.6	40	32.4 L	Own	Pier	SP	A 4	Spiric	Det	Cont	Full	R	A 4	Spic	Mer	Tim 1630	L	Own	F	10	3	53	Opt	Ros	36x5	36x5	36x5	36x5
Memominic G.	3800	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
National NB.	3800	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Noble E-71.	3800	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Nelson & LeMoon G 4.	3800	Wau L-4	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Northway B-3.	4200	Wau L-4	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Old Reliable C.	4250	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Oneida D.	4050	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Parker J-24.	4300	Wau VAU	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Perfection E.	3800	Wau K-4	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Pittsburgh D.	3800	Wau K-4	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Power C.	3800	Wau K-4	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Rainbow R-25.	3805	Wau EBU-1	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Signal M.	3805	Wau EBU-1	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Signal M.	3805	Wau EBU-1	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666	F	8	75.46	8	Ros	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	36x5	
Standard 3½-5-K.	3645	Wau EBU-1	41.2-51.2	32.4 L	Own	Bos	Opt	Opt	A 7	Own	Opt	Own	W	Tim 6666																

## 4 Ton - Con'd

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Federal WL.	4200	Cont L-4	Own F	Zen	W	Tim 6666	F	10.33.61	36x5	Smi	Fir	7000	157
Garfurd 80.	3850	Hin HA 200	Own F	Strm	W	Tim 6666	F	10.33.61	36x5	Smi	Shel	7550	162
Gramm-Pioneer 40	4475	Buds YTU	Own F	Strm	W	Tim 6666	F	10.25.50	36x5	Smi	Shel	7080	156
Hurlburt C.	3675	Own 14000	Own F	Strm	W	Tim 6666	F	10.8.49	36x5	Smi	Shel	7300	170
Kissel Heavy Duty	4475	Wis VAU	Own F	Strm	W	Tim 6666	F	11.7	36x5	Smi	Shel	7200	168
Macfar M2.	4500	Cont B-4	Own F	Strm	W	Tim 6666	F	9.75	36x5	Smi	Shel	7500	174
Perfection E-4%	4500	Pierce Arrow WC	Own F	Strm	W	Tim 6666	F	9.25	36x5	Smi	Shel	8250	162
Republie 20	4500	Cont L-4	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	6370	156
Rowe HW.	4500	Wis UAU	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	7800	168
Schacht.	4400	Buda YBU-1	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	7810	173
Service 81.	3975	Wis VAU	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	7750	174
Union H.	4500	Wis VAU	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	7600	168
U. S. S.	4075	Hin 200	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	6500	165
Wichita O.	3500	Wau DU	Own F	Strm	W	Tim 6666	F	8.7	36x5	Smi	Shel	6500	165
Acason M.	4350	Wau EU	Own F	Strm	W	Tim 6700	F	11.66	36x5	Smi	Shel	8976	180
Acme 126	4500	Cont B-5	Own F	Strm	W	Tim 6700	F	10.33.61	36x5	Smi	Shel	8000	176
American-LaFrance 5R	5500	Win	Own F	Strm	W	Tim 6700	F	10.33.61	36x5	Smi	Shel	6370	156*
Afterbury SE.	4975	Cont B-2	Own F	Strm	W	Tim 6700	F	11.66	36x5	Smi	Shel	9496	167
Atterbury SE-LWB.	5125	Cont B-2	Own F	Strm	W	Tim 6700	F	11.66	36x5	Smi	Shel	9816	192
Aufocar M.	4800	Own	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	7400	156
Available H5.	5375	Her T-3	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	7200	120
Broadway T6.	4500	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9500	190
Chicago D5.	5500	Her MU-3	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8800	174
Clinton 120L.	4990	Buda BTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8600	157
Clydesdale 4.	5125	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8750	160
Corbit AA-22.	4800	Cont B-22	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	7800	163
Day-Elder EN.	4600	Own	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8600	163
Denny 210.	4750	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8400	170
Diamond T-EL.	4490	Hin-Class B	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8800	170
Dixon	4490	Cont L-4	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8800	170
D-Olt H-5.	4850	Mid 400	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8800	168
Fageol.	5700	Wau DU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8800	168
Federal X-2.	4725	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8700	163
Garfurd 68 D.	4650	Buda BTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9250	162
Gary M.	4650	Buda BTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8600	182
G.M.C. K-101A.	4600	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8445	163
G.M.C. K-101B.	4600	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8770	187
Gramm-Pioneer 50-60.	4450	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9200	168
Hendrikson K.	4725	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9000	170
Indiana 31.	4725	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	6900	160
International 101.	4725	Jumbo 60.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8070	180
King Zeitzer.	4525	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8750	163
Luedinghaus.	4525	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9500	160
Macfar G1.	5500	Own AC.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8875	186
Mack AC.	5500	Master 61.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9400	Op
Menominee 13.	4850	Buda YTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8200	168
Moreland RX.	4600	Cont B-2	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8180	160
National OA.	4600	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8950	164
Nelson & Moon G.	4500	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8000	175
Orden G.	4500	Old Reliable D.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8600	165
Oneida E.	4725	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9400	180
Parker M20.	5250	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8400	160
Perfection EA.	4500	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8250	162
Pierce Arrow WD.	4700	Rowe F.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8200	162
Sandow L.	4500	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8700	174
Sandow W.	4500	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8200	168
Schadt.	4950	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	7720	168
Selden Unit 90.	4475	Cont B-5	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8300	169
Signal R.	5400	Own	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9225	168
Sterling-Chain EHD.	5400	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8700	168
Super Truck 100.	4600	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8000	174
Transporter 75.	4500	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	7700	170
Traylor F.	4700	Buds YTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9300	180
Ultimate D.	5500	Buda BTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8600	168
U. S. S. Special.	4500	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8200	168
Walter S.	5100	Own DU.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9300	164
Ward La France A.	4890	Wau EU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	8100	174
White 45.	4500	Own GR.	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9000	162
Wileox F.	4350	Buds YTU	Own F	Strm	W	Tim 6700	F	10.25.49	36x5	Smi	Shel	9000	162

TRADE NAME AND MODEL	Chassis Price	Make and Model Number 4 cylinder unless otherwise noted.	ENGINE DETAILS												TIRES, WHEELS, RIMS																	
			GEARSET			FRONT AXLE and Model Number			REAR AXLE			Wheels (Make)			Tires, Wheels, Rims			Wheels (Make)			Tires, Wheels, Rims			Wheels (Make)								
Fuel Feed		Governor (Make)		Cutoff (Make)		Locatinon Speeds		Make and Model Number		Front Drive		Rear		Front		Rim Equipment		Wheels (Make)		Tires, Wheels, Rims		Wheels (Make)		Tires, Wheels, Rims		Wheels (Make)						
5½, 6 and 7 Ton	4800	Own	F	F	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22					
Autocar L.....	4810	Own	Phar	Bos	Phar	Own	Own	Own	A	A	Spic	Del	Own	R	Own	F	F	F	F	F	F	F	F	F	F	F	F	F				
Clinton 120S.....	4980	Buda BTU	5½ x 5½	50	9	1	Own	Own	B-Li	B-Li	60	A	4	M-E	Row	Tim	6760	W	W	W	W	W	W	W	W	W	W	W	W	W		
Clydesdale 2.....	5100	Buda BTU	5½ x 6½	36	1	1	Own	Own	B-Li	B-Li	60	A	4	Spic	Per	Tim	6730B	C	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	Own	
Garford 150 A-7½.....	5750	Buda ATU	5½ x 6½	40	1	1	Own	Own	Spri	Sim	NF	J	4	Own	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Gramm-Bernstein 50-60.....	4450	Cont	4½ x 6½	36	1	1	Own	Own	Strm	Strm	G	Con	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Humbert E.E.....	4850	Buda ATU	4½ x 6½	36	1	1	Own	Own	Strm	Strm	G	Con	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Kelly-Springfield K-61.....	5000	Buda ATU	4½ x 6½	32	4	T	Lng	T	Zen	G	B-Li	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Luedinghaus.....	5100	Wau EU	5½ x 6½	40	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Mack AC 6½.....	5750	Own AC	5½ x 6½	40	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Mack AC 7½.....	6000	Own AC	5½ x 6½	36	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Master 64.....	6000	Buda ATU	5½ x 6½	36	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Old Reliable, L.....	6000	Wau EU	5½ x 6½	36	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Pierce Arrow RF-7½.....	5100	Own	4½ x 6½	32	4	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Pierce Arrow RE-7½.....	5100	Own	4½ x 6½	32	4	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Ramier R-27.....	5100	Cont B-5	4½ x 6½	32	4	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Service 103.....	5100	Cont B-5	4½ x 6½	32	4	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Standard 5-7½K.....	6500	Own	5½ x 6½	36	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Sterling 7½-Chain.....	6500	Own	5½ x 6½	36	1	T	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
U. S. T.....	5400	Own DU	4½ x 6½	32	4	L	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
Walter R.....	5400	Own DU	4½ x 6½	32	4	L	Lng	T	Zen	G	Wau	A	4	Pet	Per	Shel	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W	
<b>GASOLINE TRACTOR TRUCKS</b>																																
Federal Light Duty.....	4465	Cont K-4	4½ x 5½	27	2	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Federal Heavy Duty.....	4465	Cont L-4	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
G. M. C. K-41T-5-Ton.....	5100	Own	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
G. M. C. K-71T-10-Ton.....	5100	Own	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
G. M. C. K-101T-15-Ton.....	5100	Own	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Harvey WHT.....	3050	Buda ETU	4½ x 5½	28	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Harvey WHT.....	4050	Buda YTU	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
International 62½-Ton.....	4465	Own	4½ x 5½	28	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
International 102½-Ton.....	5100	Spec 6	5½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Lombard 140 H.P.....	3400	Own AB	4½ x 5½	28	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Mack AB 5-Ton.....	4950	Own AC	5 x 6	40	1	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Mack AC 7-Ton.....	5500	Own AC	5 x 6	40	1	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Mack AC 10-Ton.....	5500	Own AC	5 x 6	40	1	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Mack AC 13-Ton.....	5750	Own AC	5 x 6	40	1	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Mack AC 15-Ton.....	6000	Own AC	5 x 6	40	1	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Pierce Arrow XB.....	4465	Own DU	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Pierce Arrow WD.....	4465	Own DU	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Pierce Arrow RF.....	4465	Own DU	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W
Walter FT.....	6500	Own DU	4½ x 5½	32	4	L	Own	F	Zen	V	Phar	Eis	A	4	Spic	Del	Det	71730B	W	Shel	W	W	W	W	W	W	W	W	W	W	W	W

## Pennsylvania Highway Department Making Survey

An interesting highway transport survey is being conducted by the State Highway Department of Pennsylvania. This survey will furnish valuable information which can be used in connection with the expenditure of the \$50,000,000 authorized by the last election. The purposes of this investigation, according to Paul D. Wright, Secretary of Highways, are:

"To furnish information regarding traffic density and weight necessary to a scientific road building and maintenance programme in the State."

"To furnish information regarding present traffic in order to be able to predict future traffic."

"To determine daily and seasonal variation of traffic on primary and secondary roads."

"To determine seasonal variations in type of

## ELECTRIC COMMERCIAL CARS

Name and Model Number	Carrying Capacity	Chassis Weight Exclusive of Battery	Chassis Weight with Minimum Battery Capacity	Chassis Weight with Maximum Battery Capacity	Chassis Price	Maximum Speed	Location of Battery	Mileage Per Charge	Motor	Controller	Speeds Forward	Drive	Rear Axle	Front Tires	Rear Tires	Steering Gear	Wheelbase	Per Cent of Weight on Rear Wheels	
C-T D-1.	1000	2200	.....	.....	1700	14	A	55	G-E	Own	4	Own	Flot	Shel	36x3	36x3½	W	100	69
C-T B-1.5	1500	2300	.....	.....	2100	14	A	60	G-E	Own	4	Own	Flot	Shel	36x3	36x4	W	91½	65
C-T D-1.5	1500	2300	.....	.....	2100	14	A	60	G-E	Own	4	Own	Flot	Shel	36x3	36x4	W	116	71
C-T B-2	2000	2400	.....	.....	2350	14	A	50	G-E	Own	4	Own	Flot	Shel	36x3½	36x5	W	101	66
C-T D-2	2000	2400	.....	.....	2350	14	A	50	G-E	Own	4	Own	Flot	Shel	36x3½	36x5	W	124	70
C-T B-4	4000	4000	.....	.....	2800	12	A	50	G-E	Own	4	Own	Flot	Shel	36x4	36x4†	W	116	68
C-T C-6	6000	4300	.....	.....	3100	10	A	45	G-E	Own	4	I	D	Shel	36x4	36x4†	W	122	70
C-T C-7	7000	5000	.....	.....	3800	10	A	45	G-E	Own	4	D	Shel	36x5	36x5†	W	126	65	
C-T A-7	7000	5800	.....	.....	4150	11	A	45	G-E	Own	4	I	D	Shel	36x6	36x4†	W	122	60
C-T A-10	10000	6500	.....	.....	4250	10	A	45	G-E	Own	4	I	D	Shel	36x7	36x5†	W	132	59
Kelland AT	1000	1950	3050	3550	.....	15	S	50	G-E	4	R	Flot	Mer	34x3	34x3	Ross	102	60	
Kelland BT	1500	2050	3150	3950	.....	15	S	50	G-E	4	R	Flot	Mer	34x3½	34x3½	Ross	102	60	
Kelland CT	2000	2150	3450	4050	.....	15	A	50	G-E	4	R	Flot	Mer	34x3½	34x4	Ross	102	60	
Kelland AH	1000	2500	3600	4100	.....	15	A	45	G-E	4	C	D	Mer	36x3	36x3	Hin	106	60	
Kelland BH	1500	2800	3700	4500	.....	15	A	45	G-E	4	C	D	Mer	36x3½	36x3½	Hin	106	60	
Kelland CH	2000	2700	4000	4600	.....	15	A	45	G-E	4	C	D	Mer	36x3½	36x4	Hin	106	60	
Lansden Century	1250	1700	.....	.....	1600	15	S	50	G-E	Own	4	R	Flot	SP	32x4½	32x4½	Lav	108	50
Lansden Century	2000	1950	.....	.....	1850	15	S	50	G-E	Own	4	R	Flot	SP	33x5	33x5	Lav	112	50
Lansden Marathon	2000	2900	.....	.....	1850	12	A	50	G-E	Own	4	C	D	SP	36x3½	36x4	KH	108	60
Lansden Marathon	4000	4400	.....	.....	2250	11	A	50	G-E	Own	4	C	D	SP	36x4	36x3½†	KH	120	60
Lansden ME	7000	5700	.....	.....	2950	10	A	45	G-E	Own	4	C	D	SP	36x5	36x5†	KH	133	60
Lansden MF	10000	7500	.....	.....	3350	9	A	40	G-E	Own	4	C	D	SP	36x6	36x6†	KH	146	60
O. B. A.	2000	2175	14	.....	.....	.....	.....	.....	G-E	Own	4	C	D	.....	36x3½	36x4	Own	103	.....
O. B. B.	4000	2650	13	.....	.....	.....	.....	.....	G-E	Own	4	C	D	.....	36x4	36x3½†	Own	107	.....
O. B. C.	7000	3750	11	.....	.....	.....	.....	.....	G-E	Own	4	C	D	.....	36x5	36x4	Own	135	.....
O. B. D.	10000	3950	10	.....	.....	.....	.....	.....	G-E	Own	4	C	D	.....	36x6	36x5†	Own	143	.....
Steinmetz 10.	1000	2000	.....	.....	16	H&S	52	Diehl	Own	4	R	Russ	Shel	32x4½	32x4½	Lav	106	60	
Steinmetz 15.	1500	2300	.....	.....	16	H&S	55	Diehl	Own	4	R	Russ	Shel	33x5	33x5	Lav	114	60	
Walker 12.	1000	1900	.....	.....	15	.....	60	G-E	West	.....	.....	Tim	Det	32x3	32x3½	Ross	104	66	
Walker 15.	1500	2600	.....	.....	15	.....	60	West	West	5	Own	Math	34x3	36x3½	Ross	94	66		
Walker 22.	2000	2800	.....	.....	14	.....	60	West	West	5	Own	Math	34x3½	36x4	Ross	101	66		
Walker 42.	4000	3800	.....	.....	13	.....	60	West	West	5	Own	Math	36x4	36x6	Ross	114	66		
Walker N.	10000	6400	.....	.....	10	.....	50	West	West	5	Own	Math	36x6	38x6†	Ross	141	66		
Walker P.	7000	5600	.....	.....	11	.....	50	West	West	5	Own	Math	36x5	38x5†	Ross	131	66		
Walter HD	2000	2300	2200	16	A	60	Diehl	G-E	5	B	.....	.....	.....	32x3½	32x4	Ros	98	60	
Walter EN.	4000	4400	3100	15	A	50	G-E	G-E	5	Own	D	.....	.....	36x4	36x7	Gem	114	60	
Walter EL.	6000	5000	3700	13½	A	50	G-E	G-E	5	Own	D	.....	.....	36x5	36x4	Gem	132	60	
Walter ES.	10000	7200	4500	12	A	50	G-E	G-E	5	Own	D	.....	.....	36x6	40x6	Ros	150	70	
Walter ER.	14000	7500	4800	11	A	50	G-E	G-E	5	Own	D	.....	.....	36x7	40x7	Ros	150	70	
Ward WS 2.	1650	.....	.....	14	S	75	G-E	Own	4	W	Shel	Shel	32x3	32x3½	Own	88	56		
Ward WA 2.	2860	.....	.....	13	S	52½	G-E	Own	4	W	Shel	Shel	32x3½	34x4	Own	90	61		
Ward WA 2.	2470	.....	.....	13	S	72½	G-E	Own	4	W	Shel	Shel	32x3½	34x4	Own	90	61		
Ward WB.	3850	.....	.....	12½	S	50	G-E	G-E	4	W	Shel	Shel	34x4	36x5	Own	102	64		
Ward WB 2.	3350	.....	.....	12½	S	70	G-E	Own	4	W	Shel	Shel	34x4	36x5	Own	102	64		
Ward WD.	4875	.....	.....	11	A	50	G-E	G-E	4	W	Shel	Shel	36x5	36x7	Own	114	68		
Ward WD 2.	4350	.....	.....	11	S	60	G-E	G-E	4	W	Shel	Shel	36x5	36x7	Own	114	68		
Ward WF.	7200	.....	.....	10	A	40	G-E	G-E	5	W	Shel	Shel	36x6	36x10	Own	132	70		
Ward WF 2.	6450	.....	.....	10	S	40	G-E	G-E	5	W	Shel	Shel	36x6	36x10	Own	132	70		
Ward WH.	9400	.....	.....	9	A	38	G-E	G-E	5	W	Shel	Shel	36x7	40x12	Own	146	70		
Ward WH 2.	8200	.....	.....	9	S	38	G-E	G-E	5	W	Shel	Shel	36x7	40x12	Own	146	71		
Ward WM.	2600	.....	.....	12½	S	57½	G-E	Own	4	W	Shel	Shel	32x3½	32x4	Own	88	70		
Ward WM 2.	2900	.....	.....	12	S	70	G-E	Own	4	W	Shel	Shel	32x3½	32x5	Own	96	70		

NOTE: Battery Equipment in all above makes is at the option of the purchaser. Battery Location Abbreviations: A—amidships; H—under hood; and S—under seat.

## Would Keep Roads Open in Winter

Syracuse, December 1.—"Keep the roads of the state open the year round" will be the slogan of the largest gathering of automobile dealers ever held in this state which will meet in this city on December 14th to discuss a state-wide program of snow removal and other subjects of vital interest to the automobile business. More than five hundred automobile merchants from all parts of the state will be present.

The convention is the first annual meeting of the Empire State Automobile Merchants Association. Among the speakers announced for the meeting are Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who will discuss "The Automobile Outlook," and Harry Meixell, secretary of the National Motor Vehicle Conference Committee, who will discuss "Sound and Equitable Motor Vehicle Legislation."

"Shall New York State Tax Gasoline?" is the subject of an address by Oscar J. Brown, president of New York State Motor Federation. "Economic and Engineering Phases of a State-Wide Snow

Removal Program," will be presented by a representative of the State Highway Department, and "Licensing of all Drivers Throughout the State," as is done now in New York City, will be discussed by R. J. Howard, Deputy State Tax Commissioner in charge of the State Motor Vehicle Bureau.

The meeting is expected to result in the adoption of a platform on national, state and municipal legislation on special taxation, operating restrictions, common carrier regulation, anti-theft legislation, compulsory and forbidden equipment, uniform rules of the road, and compulsory liability insurance.

## Large Gas Merger in Oklahoma

The absorption of Hi-Power Gasoline Co., by the Hanlon Gasoline Corp., at Tulsa, Okla., will make possible the formation of one of the largest natural gasoline organizations in the world, it is said. The merger will bring the total production, which will be handled through the Chestnut & Smith Corp., to 250,000 gallons of natural gasoline daily.

## Westinghouse and Japanese Electrical Interests

The report of an arrangement between Westinghouse and Japanese electrical interests for the formation of a Japanese electrical manufacturing company has been confirmed by cables received by the Westinghouse Electric International Company, 165 Broadway, from General Guy E. Tripp, chairman of the Westinghouse Board and L. A. Osborne, president of the Westinghouse International Company, who are now in the Orient.

"The new company is known as the Mitsubishi Denki Kabushiki Kaisha, or in English, the Mitsubishi Electric Manufacturing Company," states E. D. Kilburn, vice president and general manager of the Westinghouse Electric International Company, New York. "I assume that the reported capitalization, 15,000,000 yen or \$7,500,000 is correct although word on this point has not been received."

The number of Ford dealers in the United States has shown a gain of 432 since January 1. The total number is now 9448.

# Detailed Motor

These Tables Consist Only of Specifications Received Directly From the Manufacturer. Listed Are Either Specially Designed Bus

Line Number	TRADE NAME AND NUMBER			UNLOADED WEIGHT (In Pounds)		GENERAL DIMENSIONS						ENGINE DETAILS						NORMAL SPEED M.P.H.					
	Capacity Seats	Chassis Price	Chassis Only	Chassis and Body	Recommended Body Weight	Wheelbase	Tread, Front	Tread, Rear	Floor Height	Turning Radius	Over-All Length	Over-All Width	Clearance from Ground	Make and Model Number	Bore and Stroke	Horsepower	Valve Arrang'mt	Fuel Feed	Lubrication	Carburetor (Make)	Radiator (Make)	Ignition System	
1	Acme K.	30	6900	9900	3000	200	58½	74	27	38	312	90	5	Cont 6B	3 1/4 x 5	33.7 L	V F	Zen	Own	Eis	30	5.7	
2	Avery.	18	2800	4000	129	56	56	32	42	20	262	86	9	Own 6	3 x 4	21.6 L	V S	Strm	Own	KW	20	6	
3	Belmont.	30	5000	7200	2200	184	56	56	20	27	262	86	9	Buda EBU	4 1/4 x 5 1/2	28.9 L	V F	Zen	Own	Bos	25	3	
4	Bethlehem KN.	16	1385	2650	800	125	56	56	26	175	64 1/2	10	Own	3 1/2 x 5	19.6 L	V F	Zen	GO	Bos	35			
5	Bethlehem GN.	25	2185	4100	1200	138	56	57 1/2	25	208 1/2	66 1/2	9	Own	4 x 5 1/2	25.6 L	V F	Zen	GO	Bos	25			
6	Bethlehem HM.	35	2985	5250	1500	145	56	59 1/2	26	226 1/2	70	10	Own	4 x 5 1/2	25.6 L	V F	Zen	GO	Bos	25			
7	Brinton.	25	3400	.....	Op.	58	56	58	36	30	Op.	12	12	Cont	4 1/2 x 5 1/2	32.4 L	G F	Strm	Chic	Bos	25		
8	Brockway.	25	6400	9280	2880	185	66 1/2	71	28 1/2	31 1/2	295 1/2	84	10	Buda YBU	4 1/2 x 5 1/2	32.4 L	V F	Zen	GO	Bos	25	5	
9	Brockway.	30	6400	9580	3180	197	66 1/2	71	28 1/2	31 1/2	324 1/2	84	10	Buda YBU	4 1/2 x 5 1/2	32.4 L	V F	Zen	GO	Bos	25	5	
10	Clinton.	35	4075	5925	2775	184	58 1/2	58 1/2	30	37	270	75 1/2	9 1/2	Buda EBU	4 1/4 x 5 1/2	28.9 L	V F	Zen	Own	Bos	30	3	
11	Day-Elder 20.	20	3950	.....	2500	168	56	58	32	30	237	70 1/2	10 1/2	Buda HTU	4 1/4 x 5 1/2	28.9 L	V F	Zen	Bus	Eis	35	10	
12	Day-Elder 25.	25	5000	.....	3000	180	58	58 1/2	32	27	260	75 1/2	10	Buda HTU	4 1/4 x 5 1/2	28.9 L	V F	Zen	Bus	Eis	35	7	
13	Day-Elder 30.	30	6000	.....	3500	192	68 1/2	74	25	25	271 1/2	90	7	Buda YBU	4 1/2 x 5 1/2	32.4 L	V F	Zen	Bus	Eis	35	7	
14	Defiance GL-3.	19	.....	140	56	56	28	210	84	8	Cont 8 R	3 1/4 x 4 1/2	27.3 L	V F	Chic	Bos	30	5					
15	Denby 188.	26	6540	.....	188	70	70	22	61	287	82	9 1/2	Cont 6B	3 1/4 x 5	33.7 L	V F	Zen	Lng	Eis	47	9		
16	Denby 216.	30	6860	.....	216	70	70	22	73	287	82	9 1/2	Cont 6B	3 1/4 x 5	33.7 L	V F	Zen	Lng	Eis	47	9		
17	Fageol Inter City.	22	.....	8700	218	70	70	21	33	306	7 1/2	HS 50	4 1/4 x 5 1/2	28.9 L	V F	Zen	Lng	Del	35	6			
18	Fageol Street Car.	29	9600	.....	1800	160	56	59 1/2	28	28	245	10	Cont 6M	3 1/4 x 4 1/2	27.3 L	V F	Zen	Lng	Eis	35	7		
19	Federal.	18	4200	.....	2500	190	60	60	30	28	266 1/2	10	Cont 6B	3 1/4 x 5	33.7 L	V F	Zen	Mod	Eis	35	6		
20	Federal.	25	5450	.....	3000	191	64	70	26	30	300	83	11	Own 30	4 1/4 x 5 1/2	27.3 L	V F	Zen	GO	30	5		
21	Fifth Avenue J.	29	5660	8235	2575	172	68 1/2	71 1/2	29 1/2	31	277	89	7	Yellow	4 x 6	25.6 L	V F	Zen	Eis	Own	30	7.5	
22	Ford.	.....	.....	123	56	56	.....	.....	.....	.....	.....	.....	.....	3 1/4 x 4	22.5 L	G S	Zen	Own	Own	Own	30	3	
23	F. W. D. B.	29	4200	6500	10000	156	56	56	42	30	252 1/2	89 1/2	9 1/2	Wis A	4 1/4 x 5 1/2	36.1 L	V F	Strm	Lng	Eis	22		
24	Garford 51D.	29	4350	6300	9400	3100	189	68	72	28 1/2	30	295	91	7	Buda YBU	4 1/2 x 6	32.4 L	V F	Strm	Own	Rm	35	5
25	Garford 726.	25	3750	4800	3000	168	56	65 1/2	32	30	236	78 1/2	7 1/2	Buda EBU	4 1/4 x 5 1/2	28.9 L	V F	Strm	Own	Spl	35	5.4	
26	Graham CA.	16	1325	2625	4250	1600	140	56	56	34	24 1/2	234	77	Dodge	3 1/2 x 5 1/2	24.1 L	V F	S	Zen	McC N	25		
27	Guilder.	30	4250	5400	8500	3000	191	64	70	26	30	300	83	11	Own 30	4 1/4 x 5 1/2	27.3 L	V F	Zen	GO	30	5	
28	Indiana 20.	22	5300	8900	3600	174	60	68	35	29	252 1/2	89 1/2	9 1/2	Own 38	4 1/4 x 5	27.2 L	V F	Strm	McC	Eis	23	6	
29	Indiana 25.	26	5550	9950	4100	192	60	68	35	32	279 1/2	89 1/2	9 1/2	Own 38	4 1/4 x 5	27.2 L	V F	Strm	McC	Eis	23	6	
30	International S.	14	2750	3500	750	124	56	56	20	28	260	84	8	Lyo KB	3 1/2 x 5	19.6 L	G FS	Ens	Lng	Con	25	5	
31	Jumbo.	25	6000	8500	2800	204	60	72	27	28	252	76	8	Buda EBU	4 1/4 x 5 1/2	28.9 L	V F	Zen	GO	Eis	25	8	
32	Kissel.	18	5200	7780	2400	202	64 1/2	66	24	27	23	11	Own 4-36	4 1/4 x 5 1/2	28.9 L	V F	Zen	Spar	Bos	40			
33	Larrabee X 2.	14	3350	4750	155	56	56	29	28	216	70	11	Cont 8R	3 1/4 x 4 1/2	27.3 L	V F	Zen	Fed	Bos	40	4		
34	Larrabee XJ 2.	21	4300	6100	1600	62	62	26	34	250	90	9	Cont 8R	3 1/4 x 4 1/2	27.3 L	V F	Zen	Fed	Bos	30	3		
35	Luedinghaus.	4400	5600	1200	170	58	58	58	44	11 1/2	.....	.....	.....	4 1/4 x 5 1/2	28.9 L	G S	Sheb	Brm	Spl	20	3		
36	Mack AB.	25	4435	6075	3000	195	58 1/2	60 1/2	31 1/2	37 1/2	300	88	9 1/2	Own	4 1/4 x 5	28.9 L	V F	Strm	Own	Own	21	4.5	
37	Mason.	21	1320	3100	5800	2700	150	56	56	30	246	85	10	Her O	4 x 5	25.6 L	G F	John	Fed	AuL	35	12	
38	Master DDB.	30	6000	9500	3500	194	59	59	26	33 1/2	263	86	10	Cont 8R	4 1/4 x 5 1/2	27.3 L	D G	Strm	Own	Own	32	6	
39	Menominee DB.	25	5900	9100	3200	186	68	73	26	30	256	86	10	Wis TAU	3 1/4 x 5 1/2	27.3 L	V F	Zen	Per	Rm	35		
40	Moreland RC.	16	2280	3550	2000	180	56	57 1/2	23 1/2	27	206	73	10	Cont 8R	4 1/4 x 5 1/2	27.3 L	V F	Zen	Per	Rm	35		
41	Moreland EC.	3780	4590	7590	3000	178	61	58	24 1/2	27	206	73	10	Cont 4	4 1/2 x 5 1/2	27.3 L	V F	Zen	Own	Spl	25		
42	Moreland AC.	25	4700	5660	9160	3500	187	68	69	25 1/2	27	206	73	10	Cont 4	4 1/2 x 5 1/2	27.3 L	V F	Zen	Own	Spl	25	
43	Olds.	2390	.....	.....	128	56	56	.....	.....	.....	.....	.....	.....	Own T	3 1/4 x 5 1/2	21.7 H	V F	Zen	Har	Rm	25		
44	Parker B 23 B.	16	1400	2700	4600	1900	131	58	58	30	21	204	66	10	Buda WTU	3 1/4 x 5 1/2	22.5 L	V F	Zen	Own	Wes	35	9
45	Parker E 24 B.	18	2500	3600	5800	2200	150	58	58	28	25	218	66	10	Wis SU	4 x 5	25.6 L	V F	Zen	Own	Wes	40	10
46	Phila. Motor Coach P	65	6500	8750	14650	5900	216	64 1/2	75	20 1/2	35	334 1/2	90	8	Own 6 cyl.	4 x 6	38.4 H	V F	Zen	GO	NE	25	
47	Reo F.	16	1185	2075	3360	650	128	56	56	34	22	190	66	10 1/2	Own F	4 1/4 x 4 1/2	27.3 L	D G	Strm	Own	NE	25	7
48	Ruggles Chanticleer.	16	1445	3000	5000	138	56	56	28	27	206	73	10	Her O	4 x 5	25.6 L	V F	Zen	Per	Rm	35		
49	Selden.	4850	7200	10200	3000	195	68	74	29 1/2	33	309	91	7	Cont L4	4 1/4 x 5 1/2	32.4 L	V F	Zen	Lng	Eis	25	6.27	
50	Service 61B.	40	5550	.....	192	58	56	60	30	24	276 1/2	80	8 1/2	Buda EBU	4 1/4 x 5 1/2	34.3 L	V F	Strm	McC	Eis	25	4.5	
51	Service 25B.	20	3600	.....	159	56 1/2	57 1/2	28	18	221	65 1/2	8	Buda WTU	3 1/4 x 5 1/2	33.8 L	V F	Opt	Lng	Rm	35	6		
52	Sterling GB1.	21	4050	4800	7000	2200	156	58	58 1/2	28	234	70 1/2	10	Own	4 1/4 x 5 1/2	33.8 L	V F						

# Bus Specifications

Every Commercial Car Manufacturer in the Country Was Solicited and the Jobs Chassis or Those Recommended for This Service

Line Number	ELECTRICAL EQUIPMENT				TRANSMISSION				FRONT AXLE		REAR AXLE		TIRES, WHEELS, RIMS												
	Battery (Make)	Model No.	Volts and Amp. Hr.	Starter (Make)	Generator (Make)	Clutch (Make)	Make and Model Number of Gearset	Location	Speeds	Universal (Make)	Springs (Make)	Brakes (See Note)	Final Drive	Make and Model Number	Type	Total Gear Reduc- tion in High	Total Gear Reduc- tion in Low	Steering Gear (Make)	*Pneumatic	+Dual Pneumatic	\$Solid	Front	Rear	Wheels (Make)	Rim Equipment
8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23										
1 Wil	SJRT4	6-111	Del	Rm	B.B.	Cott RU	U	4Bld	Det	A	1540 B	W	6511 S	F	6.8	35.36	Ros	38x7*	36x6†	Bim	Fir				
2			Wes	Wes	Wes	Own	U	3Pet	Math	I	Own 2-L	I	6511 D	D	8.	26.66	Ros	34x5*	34x5*	StM	Gdy				
3 USL	Spec	12-175	Bos	LN	B-Li	B-Li 55	U	4Spic	Math	A	Tim 1550	W	Tim 6511	D	6.1	21.3	Lav	34x7*	34x7*	E&O	Fir				
4 POL	613SHC	6-111	GD	GD	B.B.	Det	U	3Spic	Math	A	Eat 750	S	Eat 1000	1/2	6.86	21.3	Lav								
5 POL	613 SHC	6-111	GD	GD	B.B.	Det	U	3UP	Math	A	Shel 33FA500	R	Wis 66A	1/2	7.75	24.8	Lav								
6 POL	613SHC	6-111	GD	GD	Full	Full	U	4UP	Math	A	Shel D 343	R	Wis 88E	1/2	8.67	41.56	Lav								
7 Exi	.....	.....	Del	B-Li	B-Li 50	4E-M	Phil	4Spic	Mer	A	Tim	W	Tim	Opt	Opt	Ros	Opt	Opt	Hoo	.....	.....	.....	.....		
8 Exi	.....	12	LN	LN	B-Li	B-Li 55	A	4E-M	Mer	B	Shul 610 B	I	Clark 3DSp	D	7.	37.45	Gem			Bud	Fir				
9 Exi	.....	12	LN	LN	B-Li	B-Li 55	A	4E-M	Mer	B	Shul 610 B	I	Clark 3DSp	D	7.	37.45	Gem			Bud	Fir				
10 POL	611SHC	6-90	Bos	Bos	B-Li	B-Li 55	A	4E-M	Row	A	Tim 1544 B	W	Tim 6560	D	6.5	34.8	Ros	36x6†	36x6†	Bud	Fir				
11 Wil	SJRT 6	6-152	Bos	Bos	B-Li	B-Li 35	U	3Hart	Shel	A	Col 7018	W	Tim 6460	1/2	6.	20.2	Gem	36x6	36x7	.....	Fir				
12 Wil	SJRT 6	6-152	Bos	Bos	B-Li	B-Li 51	U	4Hart	Shel	A	Col 8513	W	Tim 6560	1/2	6.8	36.4	Gem	36x6	40x8	.....	Fir				
13 Wil	SJRT 6	6-153	Bos	Bos	B-Li	B-Li 51	U	4Sped	Shel	A	Shul 610	W	Tim 6511S	1/2	6.8	36.4	Gem	36x6	36x6†	StM	Fir				
14 Wil	SJRT 4	6	Bos	Bos	Full	Full SU 1	U	3Spic	Det	A	Col 7000	B	Eat 1000	D	6.14	....	Lav	32x6*	34x7*	StM	Fir				
15 Wil	.....	6-200	Bos	Bos	B-Li	B-Li 55	U	4UP	Det	A	Shul	I	Clark	D	....	....	Ros	36x6*	36x6†	Bud	Fir				
16 Wil	.....	6-200	Bos	Bos	B-Li	B-Li 55	U	4UP	Det	A	Shul	I	Clark	D	....	....	Ros	36x6*	36x6†	Bud	Fir				
17 Exi	.....	.....	Del	Del	B-Li	B-Li 50	4Spic	Math	A	Tim 1524	W	Tim Spec	F	4.6	19.7	Ros	36x6*	38x7	Bud	.....					
18 Exi	.....	.....	Del	Del	B-Li	B-Li 50	4Spic	Math	A	Tim 1524	W	Tim Spec	F	4.6	19.7	Ros	36x6*	36x6†	Bud	Fir					
19 Exi	3LXRE-25	6-185	Rm	Rm	B.B.	48n-Pe	Math	A	4Spic	Own	W	Tim 6460	1/2	6.5	32.5	Gem	30x5*	34x7*	Smi	Fir					
20 Exi	3LXRE-25	6-185	Rm	Rm	B.B.	Det R 400	A	4Spn-Sp	Math	A	Own	W	Tim 6560	1/2	6.75	39.8	Gem	32x6*	36x8*	Smi	Fir				
21 Wil	STRN 27	12-90	NE	NE	Own	Own	U	4Sped	Math	A	Tim 1523	W	Tim 6412	1/2	5.4	21.6	Ros	34x4	34x6	.....	.....				
22 Own	.....	6-80	Own	Own	Own	Own	U	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....		
23 Wil	STRN 6	6-125	NE	HS	Cott	3Bld	Tut	B	Own B	B	Own	B	Own B	F	7.25	....	....	....	....	....	....	....	....		
24 Wil	STRN 6	6-190	AtK	Rm	Own	Own	U	4Spic	Per	A	Tim 1550	W	6511 G	F	7.35	29.	Ros	36x6*	38x7	Bud	.....				
25 Exi	3XC-15-1	6-175	AtK	AtK	Own	Own	U	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....		
26 Exi	9318	12-50	NE	NE	Own	Own	U	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....		
27 Wil	SJRT28	12-104	LN	LN	B-Li	B-Li 51	N	4ME	Mer	B	Shul 5550B	W	Shel W 103	1/2	5.8	25.5	Ros	32x6*	36x6†	Bud	.....				
28 Wil	STRN 6	6-157	Wes	Rm	B.B.	B-Li	A	4....	Shel	A	Shel D 370	W	Shel W 21	1/2	5.8	27.8	Woh	36x6*	36x6†	Bud	Fir				
29 Wil	STRN 6	6-157	Wes	Rm	B.B.	B-Li	A	4....	Shel	A	Shel D 370	W	Shel W 21	D	6.05	25.5	Woh	36x6*	36x6†	Bud	Fir				
30 POL	613RHN	6-100	AuL	AuL	Mun	U	3....	SS	A	....	....	....	....	....	....	....	....	....	....	....	....	....	....		
31 Exi	.....	6-120	NE	NE	Full	B-Li	4Spic	Math	B	Shul 6108	I	Clark	....	8	33	Jac	36x6*	36x6†	Ind	Fir					
32 Wil	SJRT 6	6-153	Rm	Rm	B-Li	B-Li 35	U	4Spic	Math	A	Shul 610	R	Wis 60B	....	5.8	19.08	Ros	34x7*	34x7*	Whit	Gdy				
33 Exi	3XE-D	6	Bos	Bos	B-Li	B-Li 30	U	3Sped	Shel	A	Sals	B	Sals	....	5.9	25.	Gem	34x5*	34x5*	Bud	Fir				
34 Exi	3XE-D	6	Bos	Bos	B-Li	B-Li 30	U	3Spic	Shel	A	Shel	W	Shel	....	7.6	31.	Gem	36x6*	36x6*	Smi	Fir				
35 Exi	6-150	Dy	Dy	B.B.	Det	U	4Spic	Tut	A	Shul 510	R	Wis	Opt	46.	Lav	36x6*	40x8*	Bim	Fir						
36 Exi	6LXRE13	12-120	LN	LN	Own	Own	U	4Spic	Mer	B	Own	R	6.67	32.3	Own	34x5	34x5†	Jon	.....						
37 USL	.....	6-120	AuL	AuL	Hoof	W-Gr	U	3Spic	Arm	A	Fli	B	Fli	....	....	....	....	....	....	....	....	....			
38 Wil	.....	12	Wes	Wes	Full	Full GU 7	U	4Spic	Det	B	Shul 610	R	Walk 25 A	1/2	7.66	37.	Ros	36x6	40x8	StM	Fir				
39 Wil	SJRT4	6-125	Bos	Bos	Det	Cott AU	U	3Pet	Tut	A	Tim 1550	R	Wis 120 K	1/2	6.16	32.06	Ros	36x6*	36x6†	Ind	Fir				
40 Hob	6HTXR15A	6-140	AuL	....	B-Li	B-Li 30	U	3Pet	US	A	Tim 1250	B	Tim 5512	1/2	5.5	22.	Ros	32x6	32x6	.....	.....				
41 Hob	6HTXR15A	6-140	Opt	Spl	B-Li	B-Li 51	U	4Pet	US	A	Tim 1550	W	Tim 6410	1/2	6.	32.1	Ros	34x5*	34x5†	Bud	.....				
42 Hob	6HTXR15A	6-140	Opt	Spl	B-Li	B-Li 51	U	4Pet	US	A	Tim 1550	W	Tim 6511	D	6.	32.1	Ros	36x6*	36x6†	Bud	.....				
43 Wil	SJRT4	6-80	AuL	AuL	B.B.	Mun	U	3Spic	Per	A	Torb	I	Torb	D	6.5	10.03	Jac	35x5*	35x5*	AuW	Jax				
44 Gl	611	6-80	Wes	Wes	Full	Full SU 2	U	3....	Tut	A	Fli 72BA80	B	Fli 72BA10	F	5.5	22.	Lav	32x6*	32x6*	Whit	Fir				
45 Gl	611	6-80	Wes	Wes	Full	Full SU 2	U	3....	Tut	A	Cont 600	B	Fli 72BA10	F	4.9	20.	Lav	32x6*	32x6*	Whit	Fir				
46 Wil	6MVE13	12180	NE	NE	B-Li	B-Li 50	U	4Spic	Shel	A	Shul	I	At	D	7.	28.	Ros	34x6*	34x6†	Ind	.....				
47 Wil	SJRN 4	6-111	NE	NE	Own	Own	U	30wn	Pen	A	Own	S	Tim	1/2	4.7	17.29	Own	33x5*	33x5*	Mot	Fir				
48 POL	613RHN	6-100	Rm	Rm	B-Li	B-Li 30	U	3Spic	Det	A	Col 5000	B	Col 52000	1/2	5.13	21.	Jac	34x5*	34x5*	Nor	Fir				
49 POL	615 KPN	6-200	NE	NE	B-Li	B-Li 51	U	4Spic	SS	A	Tim	W	Tim	1/2	7.75	31.	Gem	36x5	36x5	Are	Fir				
50 Wil	SJRT 6	6-160	Rm	Rm	B.B.	B-Li 51	U	4Opt	Shel	A	Tim 1544	W	Tim 6560	1/2	6.75	36.12	Ros	32x6*	32x6†	Opt	Fir				
51 Wil	SJRT 4	6-120	Rm	Rm	B-Li	B-Li 31	U	3M-E	Shel	A	Shul 312	B	Eat 1500	1/2	6.85	32.8	Ros	30x5	32x6	Opt	Fir				
52 Gld	ASLR632	6-81	Bos	Bos	B-Li	B-Li 50	U	4Spic	Math	A	Tim 1544	B	Tim 646												

## Manufacturers and Models Included in Specifications on Preceding Pages

Also Manufacturers of Buses as Listed in the Bus Table

**Acason**—2, 2½, 3½, 5—The Acason Corp., Detroit, Mich.  
**★Acme**—1, 1½, 2, 3, 3½, 4½, 6½—Acme Motor Truck Co., Cadillac, Mich.  
**American**—2½, 4, 5—American Motor Truck & Tractor Co., Portland, Conn.  
**★American-LaFrance**—¾, 2½, 3½, 5—American-LaFrance Fire Engine Co., Inc., Elmira, N. Y.  
**Armleder**—1, 1½, 2½, 3½—O. Armleder Motor Truck Co., Cincinnati, Ohio.  
**Atlas**—1½, 2—Atlas Truck Corp., Div. of Industrial Motor Corp., York, Pa.  
**★Atterbury**—1½, 2½, 3½, 5—Atterbury Motor Car Co., Buffalo, N. Y.  
**★Autocar**—1, 1½, 1½, 2, 2½, 3, 4, 5 to 7—Autocar Co., Ardmore, Pa.  
**Available**—1½, 2, 2½, 3½, 5—Available Truck Co., Chicago, Ill.  
**Avery**—1—Avery Company, Peoria, Ill.  
**Belmont**—1, 3—Belmont Motors Corp., Harrisburg, Pa.  
**★Bessemer**—1, 1½, 2½, 4—Bessemer Motor Truck Co., Grove City, Pa.  
**Bethlehem**—1, 2, 3—Bethlehem Motors Corp., Allentown, Pa.  
**Betz**—7, 2½—Betz Motor Truck Co., Hammond, Ind.  
**Brinton**—1½, 2½—Brinton Motor Truck Co., Philadelphia, Pa.  
**Brockway**—¾, 1½, 2½, 3½, 5—Brockway Motor Truck Co., Cortland, N. Y.  
**Buffalo**—2, 3—Buffalo Truck and Tractor Corp., Clarence, N. Y.  
**C. T.**—1, 1½, 2, 3½, 5—Commercial Truck Co., Philadelphia, Pa.  
**Casco**—1—Casco Motors, Inc., Portland, Maine.  
**Case**—2—J. I. Case Plow Works Co., Racine, Wis.  
**Chevrolet**—½, 1—Chevrolet Motor Truck Co. of Mich., Flint, Mich.  
**Chicago**—1½, 2½, 3½, 5—Chicago Motor Truck, Inc., Chicago, Ill.  
**Clinton**—1½, 2, 3, 4, 5 to 7—Clinton Motors Corp., Reading, Pa.  
**Clydesdale**—1½, 2½, 3½, 5, 7—Clydesdale Motor Truck Co., Clyde, Ohio.  
**★Commerce**—¾, 1½, 2½—Commerce Motor Truck Co., Ypsilanti, Mich.  
**Concord**—1, 2, 2½, 3—Abbott-Downing Truck & Body Co., Concord, N. H.  
**Corbitt**—¾, 1, 1½, 2, 2½, 3, 4, 5—Corbitt Motor Truck Co., Henderson, N. C.  
**★Day-Elder**—1, 1½, 2, 2½, 3½, 5—Day-Elder Motors Corp., Newark, N. J.  
**Defiance**—1½, 1½, 2, 3—Defiance Motor Truck Co., Detroit, Mich.  
**Denby**—1½, 2, 3, 4, 5—Denby Motor Truck Co., Detroit, Mich.  
**Diamond T**—¾, 1½, 2½, 3½, 5—Diamond T Motor Car Co., Chicago, Ill.  
**Dependable**—1½, 2, 2½, 3, 3½—Dependable Truck & Tractor Co., East St. Louis, Ill.  
**Diehl**—1, 1½—Diehl Motor Truck Works, Philadelphia, Pa.  
**Dixon**—1½, 2½, 3½—Dixon Motor Truck Co., Altoona, Pa.  
**Dodge**—¾—Dodge Bros., Detroit, Mich.  
**D-Olt**—1, 1½, 2, 2½, 5—D-Olt Motor Truck Co., Inc., Long Island City, N. Y.  
**Dorris**—1, 2, 3½—Dorris Motor Car Co., St. Louis, Mo.  
**★Duplex**—1, 1½, 2, 3½—Duplex Truck Co., Lansing, Mich.  
**Eagle**—1½, 2—Eagle Motor Truck Corp., St. Louis, Mo.  
**F. W. D.**—3—Four-Wheel Drive Auto Co., Clintonville, Wis.  
**Fageol**—2, 3, 4, 5—Fageol Motors Co., Oakland, Cal.  
**★Federal**—¾, 1, 1½, 2, 3½, 5, T.T.—Federal Motor Truck Co., Detroit, Mich.  
**Fifth Avenue**—Fifth Avenue Coach Co., New York City.  
**Ford**—1—Ford Motor Co., Highland Park, Mich.  
**Fulton**—1, 2—Fulton Motors Corp., Farmingdale, N. Y.  
**★G. M. C.**—1, 2, 3½, 5—General Motors Truck Co., Pontiac, Mich.  
**G. W. W.**—1½—Wilson Truck Mfg. Co., Henderson, Ia.  
**★Garford**—1, 1½, 2½, 4, 5, 7½—Garford Motor Truck Co., Lima, Ohio.  
**Gary**—1, 2, 2½, 3½, 5—Gary Motor Corp., Gary, Ind.  
**★Graham**—1, 1½—Graham Brothers, Evansville, Ind.  
**★Gramm-Bernstein**—1, 1½, 2, 2½, 3½, 4, 5—Gramm-Bernstein Motor Truck Co., Lima, Ohio.  
**Grass Premier**—1, 1½, 2, 2½, 3½—Grass Premier Truck Co., Sauk City, Wis.  
**Gray**—¾, 1—Gray Motor Corp., Detroit, Mich.  
**Guilder**—1½, 2, 3—Guilder Engineering Co., Poughkeepsie, N. Y.  
**Harvey**—2, 2½, 3½, 6, 10—Harvey Motor Truck Co., Harvey, Ill.  
**Hawkeye**—1, 1½, 2½, 3½—Hawkeye Truck Co., Sioux City, Iowa.  
**Hug**—1½, 2—The Hug Co., Highland, Ill.  
**Hurlburt**—1½, 2½, 3½, 5, 7—Harrisburg Mfg. & Boiler Co., Harrisburg, Pa.  
**Independent**—1, 1½, 2½—Independent Motor Truck Co., Inc., Davenport, Ia.  
**Indiana**—1, 1½, 2, 2½, 3½, 5—Indiana Truck Corp., Marion, Ind.  
**★International**—¾, 1, 1½, 2, 2½, 3, 5—International Harvester Co. of America, Chicago, Ill.  
**Jumbo**—1½, 2, 2½, 3, 3½, 5—Nelson Brothers Co., Saginaw, Mich.  
**Kalamazoo**—Kalamazoo Motor Corp., Kalamazoo, Mich.  
**Kearns**—1, 1½, 2—Kearns-Dughee Motors Co., Danville, Pa.  
**Kelland**—Kelland Motor Car Co., Newark, N. J.  
**Kelly-Springfield**—1½, 2½, 3½, 6—Kelly-Springfield Motor Truck Co., Springfield, Ohio.  
**Kenworth**—1½, 2½, 3½—Kenworth Motor Truck Corp., Seattle, Wash.  
**Keystone**—2—Keystone Motor Truck Corp., Oaks, Pa.  
**King Zeitzer**—¾, 1, 1½, 2½, 3½, 5—King Zeitzer Co., Chicago, Ill.  
**Kissel**—1, 1½, 2½, 4—Kissel Motor Car Co., Hartford, Wis.  
**Krebs**—1, 1½, 2½, 3½—Krebs Motor Truck Co., Bellevue, Ohio.  
**Lange**—2½, 3½—Lange Motor Truck Co., Pittsburgh, Pa.  
**Lansden**—¾, 1, 2, 3½, 5, 6—Lansden Company, Danbury, Conn.  
**Larrabee-Deyo**—1, 1½, 2½, 3½—Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y.

**Lombard**—T.T.—Lombard Auto Tractor Truck Corp., New York, N. Y.  
**Luedinghaus**—1, 1½, 2, 3½, 5, 7—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.  
**Maccar**—1½, 1½, 2, 3, 4, 5—Maccar Truck Co., Scranton, Pa.  
**Mack**—1½, 2, 2½, 3½, 5, 6½, 7½, T.T.—Mack Motors, Inc., New York, N. Y.  
**Mason Road King**—1—Durant Motors, Inc., Long Island City, N. Y.  
**★Master**—1½, 1½, 2½, 3½, 5, 5½—Master Motors Corp., Chicago, Ill.  
**Maxwell**—1½—Maxwell Motor Co., Inc., Detroit, Mich.  
**Menominee**—1, 1½, 2½, 2, 3½, 5—Menominee Motor Truck Co., Clintonville, Wis.  
**Moreland**—1, 1½, 2, 3, 5—Moreland Motor Truck Co., Burbank, Cal.  
**Nash**—1, 2—Nash Motors Co., Kenosha, Wis.  
**National**—1, 1½, 2½, 3½, 5—National Steel Car Corp., Ltd., Hamilton, Ont., Canada.  
**Nelson-LeMoon**—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.  
**Netco**—2, 2½, 3—New England Truck Co., Fitchburg, Mass.  
**Noble**—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.  
**Northway**—2, 3½—Northway Motors Corp., Natick, Mass.  
**O. B.**—1, 2, 3, 5—O. B. Electric Vehicles, Inc., Long Island City, N. Y.  
**Ogden**—1, 1½, 2½, 3½, 5—Ogden Truck Co., Chicago, Ill.  
**Old Reliable**—2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.  
**Oldsmobile**—1—Olds Motor Works, Lansing, Mich.  
**Olympic**—2½—Olympic Motor Truck Co., Tacoma, Wash.  
**Oneida**—2, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.  
**Oshkosh**—2, 2½—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.  
**Overland**—1½—Willys-Overland Co., Toledo, Ohio.  
**Parker**—1, 1½, 3, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.  
**Patriot**—1, 2, 3—Patriot Mfg. Co., Navelock, Neb.  
**Penn**—2—Penn Motors Corp., Philadelphia, Pa.  
**Perfection**—¾, 1½, 2, 3, 4½, 5—Perfection Truck Co., Minneapolis, Minn.  
**Philadelphia Motor Coach**—Phila. Motor Coach Co., Phila., Pa.  
**★Pierce-Arrow**—2, 3, 4, 5, 6, 7½, T.T.—Pierce-Arrow Motor Car Co., Buffalo, N. Y.  
**Pioneer**—1—Pioneer Truck Co., Chicago, Ill.  
**Pittsburgher**—2, 3, 3½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.  
**Power**—2½, 3½—Power Truck & Tractor Co., St. Louis, Mo.  
**Rainier**—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Long Island City, N. Y.  
**Reo**—1½—Reo Motor Car Co., Lansing, Mich.  
**★Republic**—1½, 2, 3, 4—Republic Motor Truck Co., Inc., Alma, Mich.  
**Reynolds**—2, 3—Reynolds Truck Co., Mount Clemens, Mich.  
**★Rowe**—2, 2½, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.  
**Ruggles**—¾, 1½, 2, 2½—Ruggles Motor Truck Co., Saginaw, Mich.  
**Rumely**—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.  
**Sandow**—1, 1½, 2½, 3½, 5—Moses & Morris Motors Corp., Chicago Heights, Ill.  
**Sanford**—1, 1½, 2½, 3½, 5—Sanford Motor Co., Syracuse, N. Y.  
**★Schacht**—1½, 2, 3, 4, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.  
**★Selden**—1½, 2½, 3½, 5—Selden Truck Corp., Div. of Industrial Motor Corp., Rochester, N. Y.  
**★Service**—1½, 1½, 3, 3½, 4—Service Motor Truck Co., Wabash, Ind.  
**Signal**—1, 1½, 2½, 3½, 5—Signal Truck Corp., Detroit, Mich.  
**Standard**—1½, 1½, 2½, 3½, 5—Standard Motor Truck Co., Detroit, Mich.  
**Steinmetz**—Steinmetz Electric Motor Car Corp., Arlington, Baltimore, Md.  
**Sterling**—1½, 2, 2½, 3½, 5, 7½—Sterling Motor Truck Co., Milwaukee, Wis.  
**★Stewart**—1, 1½, 1½, 2½, 3½—Stewart Motor Corp., Buffalo, N. Y.  
**Stoughton**—¾, 1½, 2, 3—Stoughton Wagon Co., Stoughton, Wis.  
**Super Truck**—2½, 5—O'Connell Motor Truck Co., Waukegan, Ill.  
**Traffic**—1½, 2, 3—Traffic Motor Truck Corp., St. Louis, Mo.  
**★Transport**—1, 1½, 2, 3, 3½, 5—Transport Truck Co., Mt. Pleasant, Mich.  
**Traylor**—1½, 2, 3, 5—Traylor Eng. & Mfg. Co., Cornwells, Pa.  
**Triangle**—1½, 2, 2½—Triangle Motor Truck Co., St. Johns, Mich.  
**Twin City**—2, 3½—Minneapolis Steel & Machinery Co., Minneapolis, Minn.  
**Ultimate**—1½, 2, 2½, 3, 5—Vreeland Motor Co., Inc., Newark, N. J.  
**Union**—2½, 4—Union Motor Truck Co., Bay City, Mich.  
**★United**—1, 1½, 2, 2½, 3½—United Motor Products Co., Grand Rapids, Mich.  
**U. S.**—1½, 1½, 2½, 3, 4, 5—United States Motor Truck Co., Cincinnati, Ohio.  
**Velle**—1½—Velle Motors Corp., Moline, Ill.  
**Vim**—¾—Vim Motor Truck Co., Philadelphia, Pa.  
**Wachusett**—1, 1½, 2, 2½—Wachusett Motors, Inc., Fitchburg, Mass.  
**★Walker**—1½, 1, 2, 3½, 5—Walker Vehicle Co., Chicago, Ill.  
**Walker Johnson**—1, 2½—Walker Johnson Truck Co., Woburn, Mass.  
**Walter**—2, 2½, 5, T.T.—Walter Truck Co., New York, N. Y.  
**★Ward**—1½, 1, 2, 3½, 5—Ward Motor Vehicle Co., Mt. Vernon, N. Y.  
**Ward La France**—2½, 3½, 5—Walker Motors, Inc., New York, N. Y.  
**★White**—¾, 2, 3½, 5—White Co., Cleveland, Ohio.  
**Wichita**—1, 2, 3, 4—Wichita Falls Motor Co., Wichita Falls, Texas.  
**Wilcox**—1, 1½, 2½, 3½, 5—Wilcox Trux, Inc., Minneapolis, Minn.  
**Witt-Will**—1½, 2, 2½, 3—Witt-Will Co., Inc., Washington, D. C.  
**★Yellow Cab**—¾, 1½—Yellow Cab Mfg. Co., Chicago, Ill.

★ Indicates Advertisers. See Advertisers' Index.

# NO!

## Have You the Courage of Your Convictions? Have You the Will-Power to Say No? You Will Eventually; Why Not Now?

By C. P. SHATTUCK

**O**NE of the oldest truck dealers in Buffalo, N. Y., is L. H. Timerman. The writer spent an agreeable morning with Mr. Timerman early in the fall, and, as the latter frankly discussed motor highway transportation in its various ramifications, design, sales and salesmen, trade-ins, parts, bodies and service, he could not help but arrive at the conclusion that many of the so-called dealer problems could be solved if only the dealer had the courage of his convictions.

Take today's greatest problem, the problem ever with us, the trade-in. Hundreds of dealers have told me time and time again that if some one could and would work out a plan to stop the folly of wild trading, the truck business would be ideal. "If," say these dealers, "there was a plan whereby an honest allowance was made for the truck involved, if all of the dealers would stick to about the same allowance, why, we could go out and sell trucks and make real money." Then follows the usual account, perhaps exaggerated from many repetitions but true in essence, telling how so and so allowed \$10,000 for junk worth \$100.

### Has Learned to Say No!

Mr. Timerman, however, is not bothered with a trade-in problem. Yes, he takes in old trucks as part payment, but he does not permit it to be a problem. Experience taught him that it was easy to get business if the roles of buyer and seller were reversed. Mr. Timerman says he takes in only light trucks and the allowance is what the trade-in can be turned over for. He has learned to make the prospect a business proposition and to say NO when the prospect tries to jack up the allowance by playing the other dealers against him. When Mr. Timerman finds a used truck involved in the deal he first ascertains the condition of the truck and the cost to him for turning it over, and then proceeds to estab-

lish his allowance. If the figure should be \$250 that is the allowance and not \$350 or \$500. If the other dealer wants to close the deal so badly as to trade wild no effort is made to prevent the prospect from signing on the dotted line of his competitor's contract blank. Mr. Timerman refuses to dig his own grave.

### Small Sales Force; But—

Another factor is that Mr. Timerman does his own trading and is largely his own sales force. This does not mean that he had never employed salesmen. He has, but has found real salesmen as scarce as hen's teeth. So he is his own salesman and appraiser. And he is selling trucks. Not so many, perhaps as some of his competitors, but those that are sold are sold right. And there is a profit on each sale.

Mr. Timerman is concerned in two things: First, to sell the prospect the type and capacity truck required by the buyer; second, to make a profit on the transaction so that he can remain in business, carry a good stock of parts and render the owner satisfactory service. These are the fundamental principles of truck merchandising.

Another thing Mr. Timerman has been successful in, is the establishment of successful sub-dealers. He has a large territory; it extends east of Albany, and has pretty good representation. He personally investigates each section and becomes

acquainted with the potentiality of the territory before selecting a representative. He does not just pick out a dealer nor does he entrust this most important mission to a wholesale man whose chief object is to secure a "representative."

### Picks, Not Appoints, Sub-Dealers

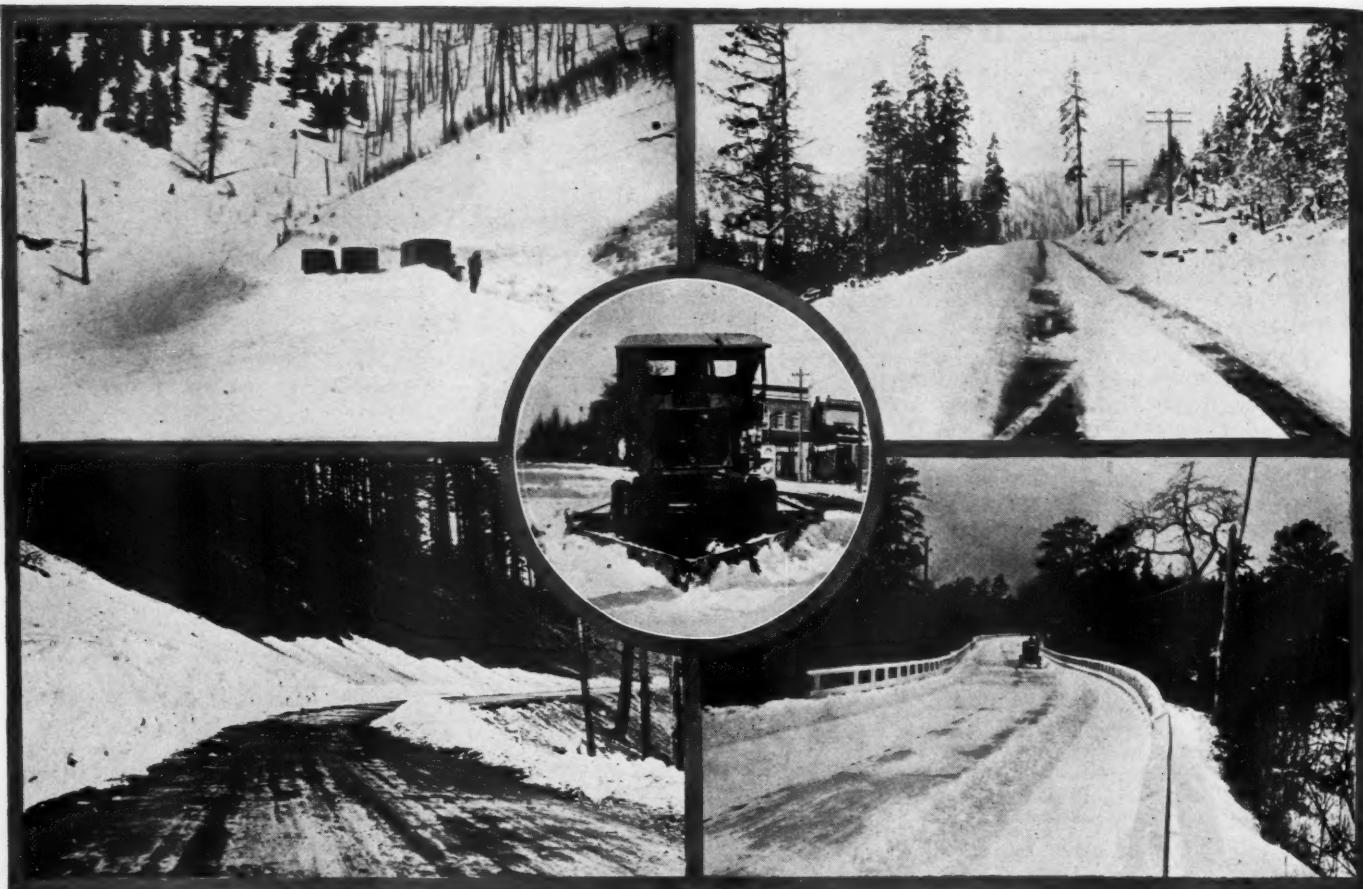
Obtaining good representatives for about 40 counties is no easy job but use of a passenger car plus common sense and a knowledge of the territory has simplified the task. It is not unusual for Mr. Timerman to drive many miles a day. Before selecting a dealer he assures himself that the dealer will be able to render satisfactory service. Mr. Timerman said that many of his best dealers have been recruited from the ranks of garages and that they have a contact with the trade in the country and small places that is a most valuable asset. Whenever an agency is appointed, Mr. Timerman does not end the transaction with getting an order for a demonstrator. He is after sales so he spends time in educating the dealer how to prepare his prospect list, how to go after the buyer of a truck and best of all, Mr. Timerman works with his dealers.

### Co-operating With the Dealers

If a dealer digs out a prospect in a new line of business and needs any assistance, a message to Mr. Timerman brings the latter down to the spot and there is some real sales co-operation. The sub-dealer is taught to work fast with a prospect under ordinary conditions but if the prospect has a proposition requiring a little intelligent study, Mr. Timerman is on the spot. He does not do all the selling and let the little dealer supply the leads. The dealer is encouraged to rely upon himself. After a while the small dealer learns to do a little analyzing himself and soon follows the procedure shown him by Mr. Timerman.

The one thing, however, that has been a real help to these dealers is the contact that





## Approaching Winter and Its Snows Revive the Old Problem: Snow Removal

Snow removal on important trunk line highways is becoming a matter of more importance each winter. The tonnage of commodities transported over highways is increasing annually by leaps and bounds. A temporary tie-up due to unusual snow-falls would inflict no small injury to our industries. Preparatory measures should be taken to meet every emergency. Highways should be kept open at all times.

In recent years we have been very fortunate. There has been no severe blizzards. As a result, barring a few regional cases, no real concerted effort has ever been made to provide equipment to keep the highways clear. It is well within the realm of possibility that this serenely indifferent attitude might receive a jolt this winter. Perhaps it will be for the best. We will be prepared the following winter.

Investigations of the Bureau of Public Roads of the United States Department of Agriculture show that there is a considerable mileage of road which the public can ill afford to lose the use of each winter.

As a result of traffic investigations in Connecticut it is estimated that 2,019,688 net tons of commodities were transported over the State system in the three months' period beginning with September, 1922. More than a

third of this tonnage moved only from 1 to 9 miles and nearly another third moved from 10 to 29 miles. These figures are given to show that in industrial sections there is a large volume of shorthaul traffic which does not compete with the railroads and which cannot be carried by the railroads when the roads become snow-bound.

It is difficult to estimate the amount of inconvenience to passenger travel caused by snow; but with at least one motor vehicle to every ten people, in a majority of states, it must be considerable.

In many sections motor bus travel is increasingly relied upon by rural communities. It is reported that there are 450 such lines in Ohio, 283 in Pennsylvania and large numbers in other states where snow is a problem. So great is the importance of keeping these lines in operation that cases are known where companies have cleared their lines of snow at their own expense.

Dealers will be rendering the country an incalculable service by pointing out to those in control of local highway matters the imperativeness of being prepared with snow removing equipment. Give the subject all the publicity at your command. Snow removing equipment also represents another outlet for your line.

*(Continued from preceding page)*

Mr. Timerman has established with them just as a sales manager does with his sales force. Another matter that built confidence is that deliveries are made promptly to the small dealer. Many times a desired truck with a certain body has been driven over the road to the dealer by Mr. Timerman. He has developed several first-class dealers among the small places. He quoted one in a certain small city as an example of what can be accomplished.

This dealer started small and in a reasonable length of time was carrying over \$3000 in parts. As to parts, Mr. Timerman does not urge stocking until a sale or two have been made and then only a reasonable amount of the quickly moving parts. As the Buffalo store carries an unusually large stock of all parts, and goods are shipped upon receipt of the order, the parts service is held to be satisfactory.

The small dealer is given co-operation in the matter of trade-ins and it is the

policy of Mr. Timerman to show him why he cannot make wild trades and make money. In summing up it would appear that it is possible to remain in the truck business and make money if foolish trading is avoided, also that sub-agencies can be developed if the distributor is to work hard with him and teach them the right principles in motor highway transportation. If all dealers, or the majority, would put into operation these principles, there would be less failures and more trucks sold.

# Interesting History of a Seven-Year-Old Bus Line

**This Article Shows How the Dealer Can Help Local Capital Interested in the Development of Rural Bus Service**

By C. P. SHATTUCK

OF the several independent motor bus lines operating out of Rochester, N. Y., the story of the White Rapid Transportation Corporation is most interesting. Three distinct features stand out impressively. First, the company was organized several years ago, and is still being carried on profitably by the same men. Second, the cost per mile of operation is low. This is explained by the fact that although the buses have long since passed the normal mileage life they are still in service. For example one has but 75,000 more miles to go when it will have been charged off twice on a 150,000 mile basis. Third, the communities served by the buses are so sold on the service that attempts to interfere with such items as franchises, etc., have failed because the taxpayers wouldn't permit "influences" to influence. Whenever a bus company can supply a better and cheaper service than the common carriers the latter are second choice.

## A Five-Bus Service

The W. R. T. Corp. operates five buses between Rochester and Lima, a distance of 20 miles. Not a very long route it is true but service is rendered the following places:

	Miles	Fare
East Henrietta	7	30 Cents
East Rush	11	50 "
Honeoye Falls	16	55 "
North Bloomfield	17	55 "
West Bloomfield	20	70 "
Lima	20	70 "

The total population of these places is 4,500. Lima and Honeoye Falls are tied with 1,600. East Rush has 500. North and West Bloomfield 300 each and Henrietta 200. These figures are given to show that under the right conditions motor lines can be profitably operated.

The start and early history of the line will be illuminating to truck dealers desirous of interesting capital in bus operation, and right here it is recorded that a dealer sold the buses to the W. R. T. Corp. The story as told by S. F. Chatterton, treasurer of the company, to the writer, is repeated nearly verbatim.

"It was just about seven years ago last June that we started. We, my son, who is president, and myself, lived in Lima and began to think about giving the people better service to Rochester. We knew that the people of the several small communities between Lima and Rochester liked to run down to the big city to shop and look around and that

the regular service provided was not so good. Take East Rush for example, if any of its people wanted to go to Rochester they had the choice of but one train a day each way and at that they had to catch the 6 A. M. out. Moreover, the train back left at 10 A. M. and as it took 1 hour and 15 minutes to make the run it didn't leave them much time in Rochester. In addition there was the inconvenience of a change at a junction. Service from Lima was not much better. Of course, railroad service today is much better, thanks to our competition, but we are still carrying the business.

"Our fares are as good as the railroads. It costs one cent more from Lima to Rochester but we run all day and make about the same time. And as the bus goes through the towns and villages our patrons are discharged practically at their door instead of a distant depot. This is quite some item in the opinion of our patrons, especially if they have been shopping and are loaded down with packages.

"Before actually launching into the bus enterprise we visited all of the taxpayers, residents and even stores of the district to determine how they felt about the proposition. The canvas showed the district almost unanimous in its approval of the project. That settled it, we organized immediately.

## Business Encouraged the Enterprise

"No, the stores have not been antagonized in the towns through which we run. They were, in fact, for us. We had lots of trouble, however, in Rochester where the railroad interests put all kinds of obstacles in our path. Their activity was reflected in the prompt refusal accorded our request for a permit of operation or franchise but the big stores got busy with us and finally we won out. I guess about 38,000 cus-

tomers a year from the small towns would look pretty good to any big city.

"Oh, I almost forgot to mention that we got 2300 signatures on our petition for franchise, which was granted, although certain interests tried to stop us from operating later on. At the show-down of the ensuing controversy the town fathers listened to big lawyers from the city and then told them that we had always been on the job, summer and winter, and that they were quite satisfied."

As for service there has been no interruption with but one exception and that was during a big blizzard when nothing moved for a few days. The senior Mr. Chatterton said that the passenger car owners in the towns are strong for the buses because they break out the roads in winter and that it is not an uncommon thing for the bus driver to notice cars in the yard waiting for the bus to come along and break the way. Two places co-operate with the buses by keeping their roads open in winter. No express is carried other than the newspapers which service is free.

## Remarkable Mileage

There are five  $\frac{3}{4}$ -ton White chassis employed, the first having been placed in service June, 1914 and the second August of the same year. The first bus has travelled about 275,000 miles, the second, 200,000. Two more were added the following year and it is estimated that these have been driven about 150,000 miles. The buses average about 1,500 miles the week. Their capacity is 14-passengers.

Mr. Chatterton, senior, stated that the cost per mile, which includes all costs, is 19 cents and attributes the low figure to the fact that the same men are now driving as when the line was started with the exception of the spare operator. These men were selected in Lima. The younger

Mr. Chatterton is a driver also. None of the operators use a coin register of any kind, and the senior Chatterton stated that his drivers do not need any watching.

"I know I get every cent taken in, my boys are honest. And we never have had an accident. The Rochester terminal is near Monument Square and is a converted dwelling. Parcels are checked free of charge."

S. F. Chatterton explained that his low cost per mile is also attributable to frequent inspection, lubrication and ad-

(Continued on page 80)



White Rapid Transportation Corporation Bus

**Federal knows from experience that only when its distributing organization makes money can it be successful—so FEDERAL gives 100% co-operation to its representatives in the form of national advertising, newspaper and bill board participation, literature of all kinds, engineering data, special equipment information, retail sales awards. That is the reason why the FEDERAL has had for many years, the largest exclusive truck distributor organization in the industry.**

**THE FEDERAL MOTOR TRUCK COMPANY**  
Detroit, Michigan.



# EDITORIALS



## Uniting Their Efforts

**T**HE term epoch-making may properly and appropriately be applied to the merger of the two large business publishing organizations, the Class Journal Co. and the Chilton Co., which is announced on page 1 of this issue. In united effort for the advancement of the industries they serve, a new period of usefulness is begun. It will be a period of extended service. It will be a period in which greater accomplishment is assured by the combination of the resources and experience of the two largest organizations of their kind, who will labor together now with mutually augmented strength and influence for the welfare of the automotive industry and its many branches.

The Class Journal Co. and the Chilton Co. have grown consistently as the years have passed from the very beginning of the industry. Each has built up a group of business publications in the automotive field which, when conducted separately, have been competitive to some extent and yet when brought together, as they now are, can and will supplement one another and, by the elimination of duplicated effort, will serve both subscribers and advertisers with a maximum of value at a minimum of cost.

All parts of the field are covered, all branches of the industry are served by the merging of these two groups of business papers. Manufacturing, merchandising, maintenance, service, production, engineering, exporting and the various phases of each of these industrial and trade activities as they apply to passenger cars, trucks, tractors, and parts and accessories are all included in the scope and activities of the publications which will work now with co-ordinated purpose and the supplementing editorial appeal for the good of the industry as a whole and all groups individually which are parts of it.

## Putting the Used Truck to Work

**A** FEW concerns are now building gasoline-operated excavating shovels, which are designed to be mounted on motor truck chassis. The chassis for moving this particular type of apparatus from place to place does not have to be necessarily a brand new one, for the simple reason that the shovel is operated by an independent gas-

oline power plant. There are many used truck chassis available which would make ideal vehicles for conveying such apparatus from place to place, whereas, the same chassis would not be serviceable in other work where economic operation and appearance is of more importance.

The dealer would do well to get in touch with manufacturers of such apparatus, and then interest contractors in his proposition. The combination would naturally bring a better price than trying to dispose of the used truck in the regular way, whereas the contractor would get an outfit that would be okay in every respect for this particular purpose. Air compressors, small concrete mixers, portable power plants, etc., can all be transported economically on used chassis and the combination would make an attractive buy.

## What About 1924?

**T**HE motor truck industry is to be congratulated on the remarkable showing made this year—a volume which has exceeded the most sanguine prognostications.

The popularity of the small truck—one ton capacity and less—as indicated in the large percentage of sales in these sizes, does not express a public preference as much as a condition; namely, that motor trucks have been bought—not sold. Had transportation been sold rather than vehicles, a more economical result would have obtained, and more profit both to the makers and users.

Each year the importance of properly selecting dealers—that type of merchant whose permanency in business is of greatest importance both to himself and to the manufacturer—becomes more apparent, and should bring to the truck industry a greater realization of the basic and fundamental problem confronting it.

Trade-ins and service problems will disappear when economic transportation, rather than vehicles, is sold.

This publication again gladly enlists its best effort toward the improvement of conditions in the industry—for the greatest good to the greatest number—and we take this opportunity to publicly express our appreciation and thanks to our patrons and friends and to wish them a prosperous New Year.

# News of the Trade in Brief

## **Motor Truck Industries, Inc., Meet in Annual Session**

A partly open and partly closed meeting of the Motor Truck Industries, Inc. took place at the Detroit Athletic Club, November 21, the second annual gathering of that body. The meeting was opened by its president, M. L. Pulcher, who commented on conditions in the industry and on the Association's efforts.

The morning session, devoted to addresses, was opened by Arthur Livingston of R. L. Polk & Company who spoke on "Market Analysis." Mr. Livingston advocated the use of scientific selling methods in the motor truck industry and told of the manner in which specialty manufacturers organize their sales department to locate prospects and close sales. He outlined a method of analyzing local markets to learn in what lines trucks are used most extensively, and to gather various information regarding capacities, makes, etc., to enable the sales force to intelligently follow up those concerns found to have need for motor transportation equipment, but which have not yet entered the market.

In discussing possibilities for 1924, Mr. Livingston said that the R. L. Polk &

Company went on record as predicting a truck production of approximately 422,000 trucks, an increase of about 13 per cent over 1923 production of 375,000.

Millard H. Newton of "Bus Transportation" spoke on "Developments in the Bus Field." Some very interesting information regarding operation of bus fleets by independents and by the public utility corporations throughout the United States was given by Mr. Newton. The morning session was concluded by a strong appeal from David Beecroft of "Motor Transport" for consideration of the possibilities of selling the fleet owner and for a more careful study of requirements in that field to give the fleet owner the type of equipment desired, and thus reduce the cost of transporting goods.

Don F. Whittaker, secretary and general manager, was called upon to outline the work of the Association during the past year and to make recommendations for its activities during 1924.

Officers were elected as follows: president, M. L. Pulcher, Federal; 1st vice-president, J. W. Stephenson, Indiana; 2nd vice-president, Fred Glover, Timken; secretary and general manager, D. F. Whittaker; treasurer, A. S. More, Selden.

## **CONVENTIONS**

**Chicago, Ill., January 14 to 19, 1924**—Annual convention and good roads show of the American Road Builders' Assn., Congress Hotel, Coliseum and Greer Bldg., S. T. Henry, Chairman, Publicity Committee, 37 W. 39th St., New York City.

**Chicago, Ill., January 29 to 30, 1924**—Annual convention of the National Automobile Dealers' Association, at the LaSalle Hotel.

**Chicago, Ill., January 30 and 31, 1924**—4th annual meeting of the Automotive Electric Service Association, at the Congress Hotel.

**Detroit, Mich., January 22 to 25, 1924**—Annual Meeting of the Society of Automotive Engineers.

**Detroit, Mich., May 21 to 24, 1924**—First International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

**New Orleans, La., April, 1924**—Spring meeting of the Automotive Equipment Association.

**New York, N. Y., January 10, 1924**—Dealers' meeting of the National Automobile Dealers' Association, at the Commodore Hotel.

## **SHOWS**

**Albany, N. Y., February 16 to 23, 1924**—15th annual show of the Albany Automobile Dealers' Assn., State Armory. Passenger cars, trucks and accessories. J. B. Wood and L. Y. Long, Mgrs., Chamber of Commerce.

**Boston, Mass., March 8 to 15, 1924**—22nd annual show of the Boston Automobile Dealers' Assn., Inc., Mechanics Bldg. Passenger cars, trucks, tractors and accessories. Chester I. Campbell, Mgr., 5 Park Sq., Boston.

**Buffalo, N. Y., January, 1924**—23rd annual passenger car and truck show of the Buffalo Automobile Dealers' Assn., 7th Regt. Armory, Carlton C. Proctor, Mgr., Hotel Statler.

**Calumet, Mich., April 7 to 12, 1924** (tentative)—10th annual Upper Peninsula Auto Show of Central Storage Co., and automobile dealers, Coliseum (40,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Joseph A. Savini, Mgr., Calumet.

**Charlotte, N. C., March 3 to 8, 1924**—4th annual show of the Charlotte Automotive Merchants Assn., Carolinas Exposition Bldg. (60,000 sq. ft.). Passenger cars, trucks, tractors and accessories.

## **Coming Events**

**Chicago, Ill., January 26 to February 2, 1924**—24th National Automobile Show of the National Automobile Chamber of Commerce, Inc., Coliseum and First Regt. Armory. Passenger cars and accessories. S. A. Miles, Mgr., 366 Madison Ave., New York.

**Cleveland, Ohio, January 19 to 26, 1924**—23rd annual show of the Cleveland Automobile Manufacturers' and Dealers' Assn., at Cleveland Public Auditorium (125,000 sq. ft.), and Central Armory. Passenger cars, trucks, tractors and accessories. Herbert Buckman, Mgr., 5005 Euclid Ave.

**Detroit, Mich., January 19 to 26, 1924**—23rd annual show of the Detroit Automobile Dealers' Assn., Convention Hall. Passenger cars, trucks and accessories. H. H. Shuart, Mgr.

**Goldsboro, N. C., April 21 to 26, 1924**—4th annual show of the Chamber of Commerce and local automobile dealers at Co-operative Tobacco Warehouse. Passenger cars, trucks, tractors, accessories and industrial exhibits. W. C. Denmark, Sec., Box 546, Chamber of Commerce Bldg.

**Indianapolis, Ind., March 3 to 8, 1924**—27th semi-annual show of the Indianapolis Auto Trade Assn., Auto Show Bldg. (60,000 sq. ft.). Passenger cars, trucks and accessories. John Orman, 338 N. Delaware St.

**Kansas City, Mo., February 8 to 16, 1924**—17th annual show of the Kansas City Motor Car Dealers' Assn., at America Royal Bldg. Passenger cars, trucks, tractors and accessories. Geo. A. Bond, Mgr., 8th Floor, Firestone Bldg., 20th and Grand Ave.

**Minneapolis, Minn., February 2 to 9, 1924**—17th annual show of the Minneapolis Automobile Trade Assn., passenger cars, trucks, accessories and industrial exhibits. Walter R. Wilmot, Mgr., 709 Andrus Bldg.

**New York, N. Y., January 5 to 12, 1924**—24th National Automobile Show of the National Automobile Chamber of Commerce, Inc., 258th Field Artillery Armory (formerly 8th Coast Armory). Passenger cars and accessories. S. A. Miles, Mgr., 366 Madison Ave., New York.

## **Krebs Motor Truck Joins Amalgamated Motors**

The Krebs Motor Truck Co., has been taken into the merger of the Northway, the Winther and the Bessemer-American interests under the new organization, the Amalgamated Motors Corp., of Plainfield, N. J.

Under the terms of the transaction the stock control of the Krebs Motor Truck Co., has been acquired by the Amalgamated Motors Corp., but J. C. L. Krebs will continue in charge of the company's affairs and will become a member of the Amalgamated board of directors. Additional working capital will be supplied by the new interests to be represented in the property.

Final approval of the Michigan Public Utility Commission of the container delivery plan of the Detroit United Railways is necessary before the plan can be put into effect. Application for a license to operate trucks in conjunction with its rail lines has been made and the company will outline its proposals at a hearing before the commission.

**Oakland, Cal., January 12 to 19, 1924**—Sixth annual show of the Motor Car Dealers Division of the Alameda County Automobile Trade Assn., at the Municipal Auditorium (33,000 sq. ft.). Passenger cars, trucks and accessories. Robert W. Martland, Mgr., 407 Pacific Bldg., Oakland.

**Omaha Neb., February 18 to 23, 1924**—19th annual show of the Omaha Automobile Trade Assn., Municipal Auditorium. Passenger cars, trucks and accessories. A. B. Waugh, 1814 Douglas St.

**Portland, Me., February 29 to March 5, 1924**—10th annual show of the Portland Automobile Dealers' Association, at Exposition Bldg. Passenger cars, trucks, tractors and accessories. Howard B. Chandler, Mgr., 5 Park Ave.

**Portland, Ore., February 9 to 16, 1924**—14th annual show of the Automobile Dealers' Assn. of Portland, Inc., Auditorium or Coliseum. Ralph J. Staehli, Sec., 424 Henry Bldg.

**San Bernardino, Cal., February 15 to 25, 1924**—Automobile show at the 14th Annual National Orange Show, in tent on Orange Show Grounds. Passenger cars, trucks, tractors and accessories. R. H. Mack, Gen. Mgr. Chamber of Commerce Bldg.

**San Francisco, Cal., February 16 to 23, 1924**—8th annual show of the Motor Car Dealers Assn., of San Francisco at Exposition Auditorium. Passenger cars, trucks, tractors, accessories, special tops and bodies. G. A. Wahlgreen, Mgr., 215 Humboldt Bank Bldg.

**Syracuse, N. Y., February 25 to March 1, 1924**—16th annual show of the Syracuse Automobile Dealers' Assn., Inc., at the State Armory. Passenger cars, trucks and accessories. C. H. Hayes, Mgr., 701 Eckols Bldg.

**Trenton, N. J., February, 1924**—9th annual show of the Trenton Automobile Trade Assn., at 2nd Regt. Armory. Passenger cars, trucks and accessories. Harold Brooks, Sec., E. Hanover St.

**Troy, N. Y., February 2 to 9, 1924**—10th annual show of the Troy Automobile Dealers' Association, at Troy State Armory (65,000 sq. ft.). Passenger cars, trucks, tractors and accessories. Frank M. Baukus, Mgr., cor. Congress and River Sts.

## Service Motors Sells Motor Coach Division to Brill

Service Motors, Inc. announce the sale of the Railroad Motor Coach Division of their business to the J. G. Brill Company of Philadelphia. The truck company will complete all orders for cars now on the books amounting to a total value of about \$300,000. In addition to that they will manufacture under contract for the J. G. Brill Company the trucks and other parts of the cars which they have heretofore manufactured in the local plant.

The purchaser is the largest manufacturer of street cars in the world, and has heretofore made the car bodies for all cars sold by the service company. They have taken over the right and will hereafter market the product under their own name. They will transfer the engineering and sales departments of the Motor Coach Division of the company to Philadelphia and expect to throw their complete organization behind the manufacture and marketing of this product.

Charles Guernsey, vice-president of the Service Motors, Inc. and general manager of the Railroad Division of that company, has resigned, effective as of November 1, to accept a similar position in charge of the manufacture and sale of these cars for the Brill Company. Mr. Gurnsey has been with the company about ten years, coming originally in the capacity of chief engineer, which position he held continually until he developed the Railroad product when he was given his present position and with the single exception of the war-time period, at which he was captain of the Motor Transport Corps in charge of the design of the U. S. A. military trucks.

John D. Ristine, sales manager of the Railroad Division of the Service Motors, Incorporated has resigned to accept a position as assistant to the vice-president of the Nason Coal Co. of Chicago.

## Advertising Managers Hold Motor Truck Session

The dominant position of advertising in the growth of the automotive industry establishes the annual advertising managers' meeting of the National Automobile Chamber of Commerce as one of the important events of the business year. This year's meeting, held at the Union Club, Cleveland, Ohio, November 22 to 23, was the most interesting since the inception of the advertising conference idea, and was the means of provoking much discussion along pertinent advertising lines.

The meeting was divided into two sessions; the first day was devoted to passenger car advertising and the second day to truck advertising. The speakers and subjects for November 22 were, "What is News?" a discussion led by M. F. Bradley; "Relation of Advertising and Sales," George M. Graham, and Co-operation Between Dealer and Factory in Sharing Advertising Cost," E. LeRoy Pelletier.

Robert B. Wood, of Autocar, speaking on "Advertising Used Trucks," urged that as much care be used in merchandising the

used truck as in advertising and selling the new product.

The results of a study of milk distribution by the U. S. Bureau of Public Roads were announced by Henry R. Trumbower, economist of the Bureau. The points of interest to the farmer, the consumer and business in the address were: (1) When roads are improved the cost of milk distribution is lowered; (2) Motor truck haulage of milk is increasing each year; (3) The motor truck is supplying added transportation facilities for a greater volume of dairy products.

Ezra W. Clark, chairman of the Motor and Accessory Manufacturers' Association Advertising Council, advocated advertising as one means of promoting more careful driving.

## Hanson Elected Director of Republic Rubber Company

At a meeting of the board of director of the Republic Rubber Co., held in Youngstown, Howard C. Hanson, manager of truck tire sales, was elected a director. Mr. Hanson came to the Republic Rubber Co., April, 1922, from the B. F. Goodrich Rubber Co., Akron, Ohio, having been with that company for seven years in charge of truck tire sales to truck manufacturers. Previous to going to Goodrich, Hanson was, for four years, Pennsylvania distributor of a well known motor truck; this experience has been of inestimable value to him in solving tire problems of truck tire distributors and truck operators.

## 1923 Passenger Car and Truck Output Will Reach 4,000,000

Production reports totalling 325,125 cars and trucks made in November, submitted at the directors meeting of the National Automobile Chamber of Commerce recently, bring the 11 months output to 3,717,709 which indicates that the year's total will reach 4,000,000. This will be a gain of more than 50 per cent over 1922 which was itself a record year.

Leaders in the automobile industry believe the increase to be due to the national need for more transportation facilities, to the rapid development of suburban areas, and to the fact that better car values for the money are being offered than at any previous time, due to the economies of large scale production.

Dealers throughout the country predict that motor car sales in the next few months will exceed last winter. Improvement in the motor truck market also is expected in the larger cities.

The monthly totals of motor vehicle production comparing 1922 and 1923 are as follows:

January .....	91,210	243,241
February .....	122,461	276,612
March .....	172,878	354,542
April .....	219,708	382,193
May .....	256,375	393,409
June .....	289,198	377,063
July .....	247,035	327,616
August .....	274,061	344,526
September .....	206,994	327,365
October .....	239,191	365,107
November .....	237,301	325,135
Total .....	2,356,412	3,717,709

## N. A. D. A. to Launch 1924 Campaign at New York

Lowering prices, increasing costs and methods of meeting the intensive competition that now prevails in automobile selling will be discussed by automobile dealers from all over the United States who will meet at New York, January 10, at Hotel Commodore. The meeting will be under the auspices of the National Automobile Dealers' Association and will be the first gathering of dealers ever held there in connection with the National Shows.

For several years past the annual meeting of the dealer association has been held in Chicago, but in the last two years there has been a gradual division of dealer attendance at both the New York and Chicago shows and at present only about half of the dealer body attends either show. It is in an effort to develop the best merchandising practices in both sections that the dealer association will launch the 1924 program at the New York meeting, duplicating the discussion three weeks later at the Chicago gathering.

The New York meeting will start at 10 o'clock and continue throughout the day. Every automobile dealer attending the New York show is invited to be present.

Speakers for the meeting will be C. A. Vane, general manager of the National Association. "The Outlook for 1924"; C. E. Gambill, President, Gambill Motor Car Co., Chicago, Hupmobile distributor, "Five Per Cent Net Profit"; P. E. Chamberlain, Detroit, "Service, the Greatest New Car Selling Asset"; J. S. Knox, Cleveland, "Salesmen Who Know How to Get the Money"; F. W. A. Vesper, St. Louis, President, Vesper-Buick Co.; "Obligations of an Automobile Dealer."

## Electric Transportation Club New Chicago Organization

Foreseeing many advantages resulting from better personal relations and from the discussion of common problems together, electric truck enthusiasts in Chicago have recently organized an Electric Transportation Club. This organization was inspired by the Electric Motor Truck Club, which meets at luncheon in New York City each month.

At the first meeting, held on October 10th, 22 men interested in the several phases of electric truck promotion were present. These represented electric truck salesmen, battery salesmen, accessory salesmen, dealers, central station men, users and others who are engaged in, or who endorse, the promotion of a more universal use of battery charged transportation units.

The club has no initiation fees, no dues and is conducted with very little formality but there is a full share of enthusiasm and "I will" spirit which augurs well in carrying out a very definite purpose. The meetings of this club, like those of the New York organization are practically devoid of any business procedure.

## Pennsylvania Railroad Using Trucks for Package Freight Service

The installation of a motor truck service between Philadelphia and Wilmington, Del., and intermediate points to handle l. c. l. freight now permits that road to dispense with two freight trains daily, one in each direction. This new package plan which is handled completely by 5-ton trucks, is the initiation of a plan which, it is thought, will eventually spread through the whole Pennsylvania system and make store-door delivery a possibility.

In commenting on the new truck service, the Pennsylvania officials have said: "The natural evolution and development of motor transportation on the public highways is tending to relieve the railroads of a considerable portion of short distance package or less-than-carload freight, especially in thickly populated territories. This has occurred in a marked degree in the densely populated section between Philadelphia and Wilmington. The result has been to reduce the traffic of the local freight trains to a point where their continued operation ceases to be justified either by earnings or extent of patronage."

The Pennsylvania Railroad has entered into agreements with a trucking organization, the Scott Transportation Co. of Philadelphia to furnish the required motor truck service in the territory affected. The railroad company has accordingly entirely discontinued the operation of its package freight trains between Philadelphia and Wilmington and intermediate stations.

## A. E. S. A. to Hold Annual Meeting in Chicago

The Automotive Electric Service Association, comprising the leading and authorized service stations of the country, will hold its fourth annual convention at the Congress Hotel, Chicago, January 30 and 31. The committee is promulgating plans which include speakers and discussion of a number of subjects of vital importance to the service men and industry. Among the subjects to be discussed is how the owners in small communities can be rendered the same high degree of service as in the large cities. The A. E. S. A. is increasing in membership and it is expected that the excellent program being arranged will bring out a record attendance.

## Commerce Established in Its New Ypsilanti Plant

The Commerce Motor Truck Co., is now established in its new plant at Ypsilanti, Mich., the move having been made with practically no interruption in production. The old plant at Detroit has been sold as a real estate proposition.

The new location affords a better arrangement of departments and a larger floor space with a resultant increase production efficiency. Better rail facilities are furnished by a spur from the Michigan Central.

## Truck Prices Changed

Price changes since the last issue of the Commercial Car Journal are as follows:

Autocar Company, Ardmore, Pa.
Model H (2 to 3 ton) from \$3100 to \$3450
Model K (2 to 3 ton) from \$3200 to \$3550
Model M (4 to 6 ton) from \$4200 to \$4650
Model L (4 to 6 ton) from \$4350 to \$4800
Acason Corp., Detroit, Mich.
2 ton from \$2150 to \$2890
2½ ton from \$2850 to \$3350
3½ ton from \$3350 to \$4150
Clinton Motors Corp., Reading, Pa.
1¼ ton from \$1980 to \$2070
4 ton from \$4160 to \$4260
5 ton from \$4890 to \$4990
5½ ton from \$4890 to \$4990
Larrabee Deye Motor Truck Co., Binghamton, N. Y.
1½ ton from \$2400 to \$2465

## Cleveland to Have Big Truck Exhibit

Cleveland will again hold a motor truck show in connection with the annual passenger car exhibit, January 19 to 26, 1924. Both shows are under the auspices of the Cleveland Manufacturers' and Dealers Association, and under the personal direction of Herbert Buckman, veteran show manager and secretary of the association. The passenger car show will be housed in the Public Hall and the truck show in the Central Armory. Exhibits will include buses, bus bodies, light trucks, heavy trucks, dump wagons, taxicabs, etc. A floor space of 25,000 sq. ft. is available. Some space has already been sold.

Last year the association presented a comprehensive truck, tractor and commercial vehicle exposition which proved to be one of the most successful of its kind in the country. The excellent results accruing from this exhibit has caused the management to repeat the exposition this year.

The Central Armory will be beautifully decorated, and an orchestra has been engaged to furnish the music during the afternoon and evenings.

## Clinton Motors Now in Truck Production

The reorganization of the Schwartz Motor Truck Corp., of Reading, Pa., has resulted in the formation of a new concern known as the Clinton Motors Corp., of which A. E. Hoffman is president and treasurer. J. H. Baynes, vice-president and secretary of the company has been in the automotive industry for 15 years.

The Clinton Co., announces that it will manufacture trucks in the following sizes: 1 ton, 1½ ton, 1¾ ton, 2 ton, 2½ ton, 3 ton, 3½ ton, 5 ton and 7 ton.

## Nolan Buys O. K. Truck Manufacturing Company

The business and properties of the O. K. Truck Manufacturing Co., of Muskogee, Okla., have been sold to the Nolan Truck Co. William H. Nolan, who is president of the Royal-Rex Motors Co., of Chicago, will be president and general manager of the Nolan company. The new concern will continue the manufacture of the O. K. trucks and trailers, also Royal-Rex trucks and trailers, at Okay, Okla.

## Vocational Tour for Automotive Delegates

An automotive vocational tour is being arranged for delegates to the World Motor Transport Congress so that studies may be made of actual uses of the automobile and motor truck in agricultural, commercial and government activities in Detroit, where automotive delegates from all countries will meet during May, 1924.

Announcement of preparations for the tour was made by Jay P. Rathbun, member of the Foreign Trade Committee of the National Automobile Chamber of Commerce, who suggests that it will tend to furnish the delegates with ideas on the numerous vocational uses to which the motor vehicle may be put. It will also enable them to secure authoritative data on distribution systems used by department stores, dairy establishments, municipal departments and other major economic enterprises.

"Efforts are being made to have tour include visits to as great a variety as possible of establishments," says the announcement by Mr. Rathbun. "This is essential in order that each delegate may secure ideas of possible application to conditions in his own country."

"The use of motor trucks in dairying establishments has a special interest to a delegate from New Zealand where the production of milk products is an important industry. On the other hand, the transportation of lumber will have an aspect of local interest to the delegate from Sweden, where manufacture of pulp is of considerable proportions."

## Boston May Have Electric Vehicle School

Because of the very successful sessions of the Electrical Vehicle School held in New York, Chicago and more recently in San Francisco, the central station interests in Boston are contemplating a fourth session of this school in the very near future.

E. S. Mansfield, chairman, Electrical Vehicle School Committee of the Electric Transportation Bureau, N. E. L. A., is desirous of conducting similar schools in other communities where the central stations are endeavoring to build up a battery charging load. To make arrangements for these lectures to be given in your community or for further information address E. S. Mansfield, The Edison Electrical Illuminating Co., of Boston, 59 Boylston St., Boston, Mass.

## Chicago Enters Fold as Sixth Booster Club

At a luncheon held at the Lexington Hotel in Chicago, November 21, the Chicago Boosters Club was organized with the following men elected as officers: R. M. Sheridan, Rees Mfg. Co., president; Garland Ames, Timing Gears Corp., vice-president; Frank Sparke, American Chain Co., secretary and Homer Ring, Advance Automobile Accessories Corp., treasurer. A very large membership is anticipated.

## Pan-Americans to be Invited to Attend "Shirt-Sleeves" Highway Study

Forty delegates will be brought to this country from Pan-American countries to make an intensive "shirt-sleeves" study of highways and highway transport under the terms of a plan approved by government, automotive, road machinery, road material and banking representatives at a meeting held in New York, November 22.

The proposal as outlined by Assistant Secretary of Commerce J. Walter Drake, T. H. MacDonald, chief of the U. S. Bureau of Public Roads, and Dr. G. Sherwell, secretary-general of the Inter-American High Commission, provides that the men to be invited will be named here, and all of their expenses will be paid by private subscription.

The immediate purpose is to give the delegates a sufficient understanding of developed highway transport to enable them to participate actively in the Pan-American Highway Congress proposed at the last meeting of the Pan-American Union and which will be held as a separate project next year. The ultimate objective is the promotion of closer relations between the United States and the other countries of the Americas.

Roy D. Chapin, Hudson-Essex Co.; W. A. Beatty, Austin Manufacturing Co., and Fred I. Kent, Bankers Trust Co., were named as an executive committee. Details in this country will be handled by the Highway Education Board. S. T. Henry, formerly of the Engineering-News-Record, will manage the project.

The motor industry was represented at the meeting by Roy D. Chapin, vice-president of the N. A. C. C.; Alfred Swayne (General Motors); A. J. Brosseau (Mack), and Alfred Reeves, George Bauer and Pyke Johnson of the N. A. C. C.

## N. A. C. C. Announces Complete Safety Committee

The full roster of the Traffic Planning and Safety Committee appointed by Charles Clifton, president of the National Automobile Chamber of Commerce is as follows:

Geo. M. Graham (Chandler), chairman; Alvan Macauley (Packard), Edw. S. Jordan (Jordan), Geo. H. Pride (Autocar), A. B. C. Hardy (Oldsmobile), John C. Long (N. A. C. C.), secretary.

The committee will hold a meeting in December to lay out plans for the coming year.

## American-LaFrance Introduces New Truck Model

Announcement of a new 2½-ton model has been made by the American-LaFrance Fire Engine Co., Inc. It will be featured by a brake design on the plan of a disk clutch with special cooling facilities. There will also be a choice possible of a double reduction or a worm drive axle. The cost of the new model will be \$3950, f. o. b., Bloomfield, N. J. or Elmira, N. Y.

## Ford One-Ton Body Shipped to Dealers

Shipments on the new 1-ton solid pressed steel two-unit body are being made from the factory of the Ford Motor Co. to Ford dealers. The body is designed for semi-heavy commercial work where a large amount of flexibility and body strength is essential.

A 90-in. steel body is used with 12-in. sides, with pockets for stakes. The cab is finished in the usual Ford dull black, is cut in graceful lines and has two doors with close-fitting, attachable curtains which open and close with the doors. The split cushion seat is used and riding comfort is obtained by excellent upholstery work.

Body will be sold cab and rear together or cab or rear separately. Price, \$120 f. o. b. factory.

## Remy Electric Company Buys Old Arvac Plant

The Remy Electric Co. of Anderson, Ind. has just purchased the plant formerly owned by the Arvac Manufacturing Co. of the same city. The Arvac Company were builders of universal joints and other automotive parts.

This plant, which is strictly modern in every respect, will give the Remy Electric Co. 85,000 sq. ft. of additional floor space for the manufacture of starting, lighting and ignition equipment. The ideal location will also afford extra shipping facilities, as the plant adjoins the main line of the Big Four R. R. and Union Traction Lines, as well as a Pennsylvania R. R. siding.

Work has already commenced on re-equipping the plant to accommodate the production of those departments which will be moved to the new location. It is the plan of the Remy Company to have their second plant in full operation by the first of the year and by that time, their working force will be around 3,700 people.

## Public Service Corporation Adds Buses in New Jersey

Sixty buses are to be put in operation in the leading cities of New Jersey by the Public Service Corp., of New Jersey. This number will be increased as additional franchises are granted.

About 147 municipalities in New Jersey are served by the Public Service Corporation's traction subsidiaries, and the motor bus service is expected to substantially increase net profits hereafter, for a department that is said to have been unprofitable in recent years.

## Fifth Ave. Coach and Chicago Motor Coach to Merge

Indications point at this time to a possible merger between the Fifth Avenue Coach Co., and the Chicago Motor Coach Co. Negotiations along this line have been under way for the past two months and the culmination of the deal awaits the coming of John Hertz, head of the Chicago corporation.

## Moskovics Speaks Before New York Dealers

Five hundred salesmen and executives in the automobile industry gathered in the assembly room of the Automobile Club of America recently and heard some facts from Frederick A. Moskovics to show that the automobile industry has many years of prosperity ahead of it, before the saturation point of the pessimists has been reached.

The meeting was held under the auspices of the Automobile Merchants' Association of New York. Samuel S. Toback, vice-president and general manager of the New York Marmon Company, presided as chairman of the Association's Used Car Committee.

Mr. Moskovics, who was formerly vice-president of the Nordyke Marmon Company of Indianapolis, pointed out that even with an annual production of four million cars, the country could not possibly reach its limit of absorption in from twenty-five to fifty years. He called attention to the relatively small number of cars per capita in many states and the lack of good roads in some of the largest rural states as proof of his assertion that there is room in the country for vastly more automobiles than are now being used and that the demand will undoubtedly continue even after there are twenty-five or thirty million automobiles in use. The annual retirement of worn out cars will in itself keep alive the industry and call for normal expansion for many years to come.

C. A. Musselman, general manager and treasurer of the Chilton Company, offered the prize of a gold watch to the salesman who for a period of sixty days, best serves the interests of his employer, the contest to be decided under rules framed by a committee of salesmen.

## Clark Equipment Experiencing Heavy Axle Demand

The Clark Equipment Co. is now manufacturing bevel drive axles in four sizes for trucks and buses, from 1 to 2½-tons capacity. It also is building a special model for taxicab use.

"The demand on us for axles is so great," says E. B. Ross, vice-president of the Clark Equipment Co. in charge of the axle department, "that our plant is operating at full capacity, an unusual condition at this season of the year, when there is generally a let-down in production requirements. The demand that is greatest is for axles for light delivery and high speed truck."

## Nu-Cord Tire Undergoes Reorganization

The Nu-Cord Tire & Rubber Co., of Greensburg, Pa., and West Jeannette, which went into the receivers hands last year has been reorganized. A charter has been applied for with capital stock of \$150,000. J. E. Myers has been elected president.

## Personal Items

**Charles A. Abbott** has been appointed special representative of the national sales division of the Federal Motor Truck Co. He will direct the sale of Federal trucks among national users in the eastern division, from his headquarters in New York.

**William A. Baker**, who has been in charge of the Detroit offices of the Firestone Steel Products Co., for some time past, has been appointed sales manager of the company. He will remove to Akron to take up his new duties.

**Roy E. Berg** has joined the sales department of the United Manufacturing & Distributing Co., of Chicago. He was formerly with the Columbia Carburetor Co., also of Chicago.

**Joseph J. Burke** who has been representing the Brunner Mfg. Co., in the New York territory, has succeeded J. H. Mehan as sales manager of that company. Mr. Mehan recently resigned to become manager of the Research Club.

**Allen F. Cannon**, formerly of the Mayo-Skinner Mfg. Co., and the Victor Mfg. & Gasket Co., has been made special representative for the Folberth Auto Specialty Co., of Cleveland, O., in the territory covered by Illinois, Indiana, Iowa and Nebraska.

**P. L. Emerson**, formerly sales manager of the Olds Motor Works and assistant sales manager of the Reo Motor Car Co., Lansing, has joined the Yellow Cab Manufacturing Co., in Chicago. Mr. Emerson will work with the director of sales and will assist in introducing the new one-ton truck, the Yellow Cab Express, which was recently announced.

**Ethelbert Favary**, widely known as an automobile engineer, has moved to Los Angeles, where he has associated himself with the Moreland Motor Truck Co., as consulting engineer.

**George Dudley Loomis**, president of the Tiffin Wagon Co., Tiffin, O., commercial car and bus manufacturers, died November 1, at the age of 76. Mr. Loomis was also president of the Loomis Machine Co., and the Tiffin National Bank.

**P. T. Malo** has rejoined the L. F. Mullin Co., Reo distributors in Detroit, and will serve as sales manager in charge of the merchandising of passenger cars and Speed-wagons. He has been in the Detroit automobile field for 10 years, having served for seven years with the Mullin company.

**George D. Metzger** has been made sales manager of the Cincinnati Screw Co., Loveland, O. He organized the Metzger Welding Corp., of which he is president.

**James D. Mooney** has been elected a director of the General Motors Corp. In November, 1922, he was made vice-president of the General Motors Corp. in charge of export matter. He is also president of the General Motors Export Co.

**R. E. Morrison**, vice-president and controller of the United States Motor Truck Co., has resigned his connection and will become a member of the firm of Gustetter, Madison & Morrison, Union Central Bldg., Cincinnati, accountants. Mr. Morrison will specialize in cost system and tax consultation in the automotive industry.

**Paul S. Smith**, for 10 years chemist and chemical engineer for the O'Bannon Corp., has joined the Duratex Corp., of Newark, N. J., as chemical engineer.

"Jim" Stewart, nationally known motor truck engineer, has resigned as general sales manager of the Signal Motor Truck Co., to become associated with the Standard Motor Truck Co., of Detroit. He has been with the truck industry for more than 17 years.

**Charles W. Wolfe** has recently been appointed sales manager of the Century Rubber Works of Chicago. Mr. Wolfe was formerly sales manager of the Federal Rubber Company of Illinois, Cudahy, Wis.

## Trade Changes

**The Diamond T Motor Car Co.**, at Chicago, Ill., has purchased a new building for service and parts purposes at 18-24 S. Sangamon St., extending through the block to 17 S. Morgan St., with a 100-ft. frontage on each street. The station is to be equipped with pits to accommodate 10 trucks at a time, and will require a crew of 40 mechanics. G. R. Lott will continue supervision of the new service station. The sales branch will remain at Sangamon St., and Washington Blvd.

**The Heil Co.**, Milwaukee, Wis., announces two new distributors, the Kranz Automotive Body Co., St. Louis, Mo., to cover St. Louis territory and Shop of Siebert, 614 Southward Ave., Toledo, for the Toledo territory.

**The Lomar Manufacturing Co.**, of Midletown, O., has opened a branch at Atlanta, Ga., under the name of the Lomar Southeast Co., to serve the southeastern States. Branch is located at 188 Spring St.

**The Four-Wheel Drive Lorry Co., Ltd.**, representing the FWD truck in England, has been compelled to move to new and larger quarters at 46 Charing Cross, London, S. W. 1, on account of the rapid increase in FWD business.

**The Central Chevrolet Sales, Inc.**, of Cleveland, O., has moved from its former location at Euclid Ave. and E. 69th St., to a new building at Euclid and East 66th St. The new quarters afford 40,000 sq. ft. of floor space.

**The Allen-Russel Body Co.**, Lansing, Mich., is building a warehouse and sales room directly opposite the Reo Motor Car Company's offices on South Washington Ave., Lansing, Mich. A full line of truck bodies will be carried in stock.

**The Charles E. McInnes & Co., Inc.**, will handle the sale and serving of Ward electric trucks in the Philadelphia territory. The new distributor is located at 2037 Market St., and the business is in charge of J. C. Boyers, general manager.

**The Cartinhour-Bowman Co.**, Indiana distributor of the Federal and United trucks, has moved from 619 N. Capitol Ave., Indianapolis, to 933 N. Capitol Ave. The new building will afford greater sales and service facilities.

**The Nichols-Evans Co.** is the new name for the Nichols-Moore Co., of Cleveland, O., advertising agency. Walker Evans, Jr., formerly with Blackman Co., of New York, and McManus of Detroit, has joined the company in the capacity of president.

## Literature

**The Clark Equipment Co.**, Buchanan, Mich., has published a booklet giving data on the use, design and construction of bevel drive axles for motor trucks, motor buses and taxicabs. This booklet will be sent without charge to all interested inquirers. It shows how the application of power through the bevel drive axle gives high efficiency. The booklet is fully illustrated with photographs of complete axles and their essential parts. It also enumerates the tests of a good truck axle, gives directions for the care, adjustment and lubrication of bevel drive axles, and devotes a section to directions for the adjustment of bevel gears in assembly, the latter also being illustrated with numerous drawings and photographs.

## University of Michigan Provides New Working Space for Highway Course

The University of Michigan, in 1919-1920, offered the first course in highway transport to be given in an American educational institution. The number of courses in highway transport now numbers eleven. The rapid development in educational work in highway engineering and highway transport is indicated by six courses in highway engineering being offered in 1918-1919 and twenty-five courses in highway engineering and highway transport being given in 1923-1924.

The Board of Regents has made provision for the personnel of the new Division by establishing a Chair of Highway Engineering and Highway Transport and the appointment of an associate professor, an assistant professor, a librarian of the Davis Library of Highway Engineering and Highway Transport, an instructor and three assistants in highway engineering.

At the time of the organization of the division, an ideal arrangement was made with the Michigan State Highway Department under which all the testing of highway materials for the department would be made in the university laboratory. This co-operative relationship has been efficiently developed in the interests of both the State and the university.

Through the generosity of Roy D. Chapin and the Detroit Edison Company, one Fellowship in Highway Transport and three Fellowships in Highway Engineering have been available each year since 1919-1920. Each Fellowship pays the sum of \$250 with an allowance of \$50 for expenses.

The development of the activities of the division, the rapid increase in the enrollment of graduate and special mature students, and the expansion of the work of the highway laboratory, influenced the Board of Regents to allot twenty thousand square feet of working space for the offices, library, drafting room, graduate lecture rooms, and laboratories of the Division of Highway Engineering and Highway Transport in the new East Engineering Building, which was opened for use at the beginning of the present collegiate year.

## Graham Brothers Buys Two Plants in Detroit

Two plants, the factory formerly occupied by the King Motor Car Co., and the units built by the Denby Motor Truck Co., but never occupied, have been acquired by Graham Brothers at Detroit. The acquisition of these plants will give the Graham organization three times its former manufacturing facilities.

The King plant is to be used for chassis assembly work while the Denby plant will be converted into a paint shop and storage unit. Because of the proximity to the Dodge Brothers' plant greater facility in handling materials is afforded.

Graham Brothers is now working on a production schedule of approximately 50,000 motor vehicles a year.

# Tire Dealers Discuss Merchandizing Plans

## Desire to Develop Better Business Ethics and Bring About Stable Policies Through Co-operation With Manufacturers

By C. S. PERRIE

**T**HAT the better class of truck and passenger car tire dealers desire to conduct their business on sound business principles, co-operate with the manufacturer in bringing about stable policies, and educate other dealers to the vital need of being better merchants, were the high spots of the fourth annual convention of the National Tire Dealers' Association held in New York City, November 13-15. Dealers from 20 states and 44 cities were represented, including points as far west as Portland, Ore. Manufacturers were also well represented.

It was an enthusiastic meeting. A few who advanced plans bordering upon the radical, withdrew their motions and supported motions in keeping with the spirit of the convention which was to bring about a better understanding between manufacturer and dealer. The enthusiasm and accomplishments of the association were evidenced in the raising of a fund of over \$3000 to carry out the program of 1924. The delegates paid a fitting tribute to George J. Burger of New York, who has been an enthusiastic worker on behalf of the association during the past year, by re-electing him president.

The visitors were welcomed by a representative of the Mayor of New York, and Walter

E. Layman, president of the Greater New York Tire Dealers' Association. In his opening address President Burger outlined the objectives of the N. T. D. A., and described how it had been a distinct benefit to every tire dealer. He pointed out that the association's work was constructive, and that its conservative policies would be continued. He made a forceful appeal for moral support of the officers and board of directors and stated that if the various locals would give the same support as in 1923, the association would become truly national in its scope.

Mr. Burger paid a warm tribute to the manufacturers for their co-operation during the past 12 months, stating that the manufacturers had displayed a very commendable spirit, and that there was every

evidence that the same co-operation would continue through 1924. He urged that in the discussions during the convention that problems be discussed in a clean spirit, that personal matters be avoided. This was urged, he said, to contradict rumors that have been circulated in the past among certain types of dealers. In commenting upon the possibilities of the N. T. D. A. he declared that locals were being formed in many cities and that the future of the N. T. D. A. was assured provided the members gave the same moral support in 1924 as in the past year. Remarks in a similar vein were made by Thomas F. Whitehead, a director, of Chicago.

After the appointment of the various committees, and a decision that the meetings be open, adjournment was in order. In the evening there was a beefsteak dinner served up-town with suitable entertainment.

The second day's program opened with a financial report by President Burger giving in detail how each dollar of the dues were spent and this report was well received. After reading the list of cities with affiliated locals, President Burger gave way to Ray Conway, Oregon, who stated that his association had appointed a committee which was to



Executives of the Fourth Annual Convention of the National Tire Dealers' Association

From left to right seated: L. E. Brown, New York, elected president of New York Tire Dealers' Association, Nov. 19; Sydney Richman, Chairman Arrangement Committee on Convention; Walter E. Layman, New York; George J. Burger, elected President of National Tire Dealers' Association; H. A. Ruhnke, Milwaukee, director; E. P. Farley, Minneapolis, director; Clay D. Manville, Pittsburgh, director; H. T. Miller, Pittsburgh.



Dealers From Points as Far West as Portland, Oregon, Were Gathered at This Convention

make a tour of the Pacific Coast for the purpose of forming tire dealer associations not already organized and members of the N. T. D. A. The balance of the morning session was given over to routine business, reports, etc.

A most instructive address on merchandising was given by Richard Lennihan, assistant director of the Harvard bureau. He explained how the bureau functioned and told of the survey to be made among tire dealers in conjunction with the U. S. Rubber Association. He stressed the importance of the dealer knowing his overhead and cited a number of concrete examples resulting from surveys in various lines of endeavor to show that many did not know what overhead really was.

There were three general types of retailers, said the speaker. One was the merchant who didn't know the real cost of doing business, and transacted business at a loss; those who realize they must keep accurate records, and those who believe keeping books a waste of time. The speaker pointed out that one serious error on the part of the retailer was that he failed to charge his own salary. Another was that of the man who owned the building and did not charge rent. There are a great many of these types, said the speaker. Another interesting fact stressed was the minor legitimate expenses, i. e., bad debts, depreciation, etc., will amount to one-tenth of 1 per cent of the annual sales.

The speaker went on to describe the plan of the bureau to work out a standard form for a survey of the retail industry of the country. The dealers are to be presented with a form about February next and will be asked to supply the data which will be held strictly confidential by the bureau. From this data charts will be plotted to serve as a yardstick to measure the proper overhead and turnover in the tire retail trade. Mr. Lennihan said that the Rubber Association deserved credit for the plan and that it was due to the association realizing that their success as manufacturers depended upon the success of their dealers. The survey would, he said, develop better retailers and be of great aid to tire dealers inasmuch as it would greatly aid in eliminating the competitor who unknowingly sells at a loss.

R. W. Davis, of A. Schrader's Son, Inc., followed with an interesting and instructive paper on the proper use of tire valves. He stated that a survey made by his company showed that there was a sad lack of knowledge of the fundamental principles of the tire valve, and he explained the points in detail. He illustrated his address with a large valve. He also stated that his company was bringing out a special valve for the balloon tire with calibrations in pounds. W. F. Schmidt, special representative, N. Y. Telephone Co., described how the telephone could be used economically and for merchandising. W. Herman Greul, analyzed production and merchandising.

The adoption of the 1924 platform brought about spirited discussions. A committee had been previously appointed to consider the numerous suggestions made in writing and verbally, by the vari-

ous delegates and these were boiled down and presented by the committee to the convention. It is fitting to state, however, that the suggestions do not reflect the tendencies of the majority. These suggestions were numbered and were presented for discussion.

The first, the distribution of tires, created much discussion. There were various amendments but in the end the tire dealer was defined as one who carried a stock of tires. The original resolution read that selling tires should be the principal item. This was opposed as being unfair to the small town dealers who sold tires right but did not make tires their leading item.

Another resolution adopted was that the manufacturer should market his blemished and seconds through manufacturers' dealers only as it was held that the conventional methods worked a hardship to the tire dealer.

The third resolution, to eliminate the publication of price advances and declines in advance by the manufacturer, was adopted without discussion. The fourth resolution, that dealing with the abolition of spring datings, took the form in the end of a recommendation to the manufacturer inasmuch as the manufacturers have completed their 1924 plans. The resolution will be considered by the directors and officers of the N. T. D. A. in their future conferences with the manufacturers.

Another resolution asked that car manufacturers refrain from supplying as standard equipment other than four tires and tubes. The next resolution called for the standardization of tire types and sizes. The resolution to incorporate the N. T. D. A. was passed unanimously. The resolution that the same price be made to both the tire dealer and car manufacturer was unanimously adopted. It was also voted that orders from car dealers to manufacturers be referred to tire dealers, it being pointed out that some car dealers gave the customer the discounts to further car sales. It was brought out that in some cities, particularly Chicago, that some car dealers exchange the original tire equipment of four tires for lesser known makes and receive an extra tire and tube in exchange. This practice was strongly condemned.

Another resolution that met with favor was that a committee representing the N. T. D. A., and one representing the tire manufacturers, meet every three months in conferences on matters pertinent to the industry. Among other suggestions made were that manufacturers should discontinue selling direct to commercial accounts and from factory branches direct to consumers. While these resolutions were adopted on the floor they will be taken under advisement by the board of directors of the association.

The ways and means committee presented an amendment to the by-laws to the effect that any one joining the national association during the first half of the calendar year shall pay the \$10 fee and \$5 if joining during the second half. This was adopted. It was brought out that an emergency fund of \$3000 would be necessary to carry on the campaign of the as-

sociation in 1924 and a bond issue in multiples of \$10 bearing interest at 5 per cent was authorized. The resolution also provided for the sale of a limited number of life memberships at \$50 each. Over 100 bonds and 40 memberships were quickly disposed of.

The election of officers and directors was as follows: president, George J. Burger, New York City; vice-president, Thomas F. Whitehead, Chicago; directors, E. P. Farley, Minneapolis; N. W. Howell, Wilmington, Del.; H. A. Ruhnke, Milwaukee, Clay D. Manville, Pittsburgh; P. J. Quigley, Memphis, Tenn.

Dayton, Ohio, was selected as the convention city for 1924. Resolutions were adopted thanking President Burger and the board of directors for their work in 1923 and to Miss Moriarty, assistant to the president.

On the final evening the delegates attended a banquet at which W. W. Duncan, Hood Rubber Products Co., spoke in place of E. H. Broadwell. Mr. Duncan gave a most interesting address in which he described the history and growth of the Rubber Association of America and its efforts in bringing about standardization of tires, education of the dealer and consumer. He also touched upon the survey to be made by the Harvard bureau and urged the dealers to co-operate. Robert S. Binkerd, vice-chairman of the committee on public relations of the Eastern railroads described what the common carriers were doing to aid the shipper and co-operate with the automobile industry. President Burger in his address urged again that the dealers support the N. T. D. A. and painted a glowing picture of its future.

## Sorge & Sabeck Send Representatives to U. S.

For the purpose of making new business connections between the United States and Central Europe, also Spain, in the automotive accessory field, the firm of Sorge & Sabeck, Unter den Linden, 56, Berlin, Germany, are sending their manager Georg Sorge, and their general representative, Edgar Hoppe to the United States in December. Their headquarters will be: Care of White & Case, 14 Wall St., New York City.

## Runs Automobile on Abandoned Railway

An enterprising native of the State of Maine has solved the problem of what to do with an abandoned railway. Some months ago the Bangor and Aroostock Railway discontinued service over its 12-mile branch running from Brownsville to Katahdin Iron Works. Henry Green saw his opportunity. He started with a small automobile and an idea. The idea was to fit the car with flange wheels and make it run on the unused rails. He rented the whole branch line from the railroad company at \$100 a month and started business. Now traffic is so brisk he is using a trailer behind his car.

# Highway Transport an Aid to the Railroads\*

## A Digest of Valuable and Interesting Slants on the Utility of the Truck, Showing How Naturally This Unit Fits Into the National Freight and Passenger Transportation Fabrics

**O**NLY through the co-ordination of the four great railway systems of transportation, railway, waterway, airway, and highway, and the enactment of legislation which will permit the efficient development of each agency will the public welfare best be served.

It may appear audacious to bluntly announce that highway transport is an aid to the railroads, especially in the face of statements frequently appearing such as that of one railroad president who charged a deficit of \$4,856,000 to motor vehicle competition. Bald conclusions of this character appearing in the public press bring to the mind of the reader the much maligned motor truck tearing up the public highways. The public does not analyze the true meaning of the loss in revenue. It does not appreciate the large percentage of reduction of railroad receipts due to the operation of the family motor car. It does not know that some railroads are experiencing a reduction in gross revenue but would not suffer a loss in net profits provided that they efficiently used their facilities for the handling of those phases of transportation for which they are pre-eminently adapted to handle profitably.

### As a Supplement Only

Railroads are not going to cease to function because of the development of highway transport. The railways are and always will be a vital part of our transportation system. They have a distinct economic field in long shipments and car load business. The writer believes that the American railroad official will soon administer his system of transportation with full recognition of the true value of highway transport to the railroads and the part which it will play in national development.

The railroads can render immediate valuable service to the public and to themselves by helping to direct the development of highway transport as feeders to rail lines and as extensions of rail service.

What are the opportunities for the railroad to function as an operator or user of highway transport?

First: The transportation of freight by motor trucks from one railway terminal to another in the same or nearby city. The advantages of the utilization of highway transport, as compared with the tedious method of rail transportation by "trap" or

"transfer" cars over congested tracks have been appreciated by a few railroad officials. It has been established in some cities, notable examples being found in Cincinnati and St. Louis.

Second: The organized delivery with motor trucks of carload freight from public team tracks in large terminal areas. With such a system in effect, it has been stated that the present freight car equipment of the railroads would be sufficient to meet all transportation needs for several years to come.

### Tributary Bus Routes

Third: Extension of transportation service through the medium of motor truck and motor bus routes. There are several methods of development practicable in this field. Urban and interurban electric railway lines may logically expand their passenger transportation facilities through the establishment of tributary motor bus routes. During 1922, sixty electric lines throughout the United States used motor buses to supplement their rail service. Steam railroads may enter this field through the development of intercity and rural motor express lines to carry both commodities and passengers. One of the most notable examples is afforded by the highway transport service of the Great North of Scotland Railway Company which established its first motor truck service in 1914. In 1921, this railway company was operating five passenger routes and seven intercity motor truck routes. Railroads having stations in scenic areas may well give consideration to another development by the Great North of Scotland Railway Company which operates from Aberdeen a motor bus line for tourist traffic.

### Store-Door Delivery Plan

Fourth: The collection and delivery of freight in municipalities and adjoining areas, which is similar to the methods universally employed in large cities handling express shipments. This phase of highway transport would be a development of what is commonly known as the store-door delivery plan. The ruling of the Interstate Commerce Commission in the case of the Baltimore development along this line means that it is impracticable for interstate railroads at present to use their own trucks in this manner except on such a large scale that the charge of discrimination in services rendered could not be brought against them. It is impossible, however, to arrange with a large trucking organization to render this

service. A development in Michigan is the plan of the Detroit United Railway to establish a pick-up and delivery system with motor trucks especially equipped to carry box containers, one or more containers being used for the freight of one shipper.

W. H. Lyford, vice-president of the Chicago and Eastern Illinois Railway Company, believes that another field for the profitable use of the motor truck is the transportation of freight between communities which are served by branch lines of railway on which the traffic is too light to pay the expenses of any kind of railway transportation. He further says that no more such branch lines ought to be constructed if the highway transport operator will take over this field and occupy it intelligently and efficiently, and that money-losing branch lines along which transportation by motor truck over existing highways could be furnished at less expense should be abandoned.

### Why Buses are Economical

The Pennsylvania Railroad goes a step further as is shown by the statement of one of its officials: "The railroads still do a great deal of purely retail business. Some of it perhaps pays its way, but much of it unquestionably entails a loss. In the immediate vicinity of all our highly developed commercial and industrial communities, an immense amount of such traffic originates. A large portion of it moves only a few miles but in its handling we are obliged to employ the most costly and overworked facilities which the railways own, namely, the yards and terminals in the great centers of industry and population. Here is a real opportunity for the motor truck to demonstrate its utility upon a true economic basis. The reason why less-than-carload freight traffic, especially on the shorter hauls, is becoming a growing burden upon the railroads is that we are obliged to use its terminal facilities and rolling stock which are too expensive and which of necessity must be primarily planned and adapted to the handling of bulk traffic, mostly moving over the longer hauls. Therefore, I believe it to be at least probable that in many instances the short haul less-than-carload freight traffic could be turned over bodily to motor trucks with resulting advantage to the railroads and the patrons."

The views of state officials on certain phases of the interrelationship between railway and highway transport are indicated by the following excerpts from

\* Excerpted from an address by Arthur H. Blanchard, President National Highway Traffic Association, and Professor of Highway Engineering and Highway Transport, University of Michigan.

the 1922 Report of the Committee on Motor Transportation to the National Association of Railway and Utilities Commissions:

"Auto truck transportation meets a public demand in the rapid transit of less-than-carload shipments, including the door-to-door delivery element which railroads have thus far failed to furnish. Railroad companies have exhibited a degree of indifference or slowness bordering on stupidity in recognizing and meeting demands of the public for quicker and more convenient movement of less-than-carload freight.

"It is evident if rail carriers hope to retain their short-haul freight traffic, it will be necessary for them to make radical changes, both in service and equipment. Trucks are rendering an astonishing service between shopping centers and outlying trading points.

"Another respect in which truck service is preferable, is in the movement of household goods from one town or city to another. It eliminates the cost of crating and cost of cartage from house to depot and vice versa.

In closing, allow me to transmit to you the following pertinent message from our late President, Warren G. Harding: "The transport facilities of the whole world, whether by rail or by water, or

whether represented by the great network of public highways, have been confronted with a most difficult situation for a number of years. It is one which demands the very best and wisest treatment from the standpoint of both the technical and economic and financial authorities. The whole program of transportation—in all its phases it must be regarded as that of a single problem—is the most pressing and difficult that the entire world is facing today."

### Any More in Favor of This?

To the Editor,

In your issue of the Commercial Car Journal for October 15, 1923, I notice a short sketch by Mr. E. A. Williams, Jr., of the Garford Motor Truck Co., of Lima, Ohio, on the used truck value appraisal on page 54. I, as a dealer of motor trucks, think that this idea would be the greatest boon to the truck industry that has ever been adopted. I am heartily in favor of just such a policy and make the manufacturers, distributors and dealers live right up to it. There should be no need for very much of a penalty because if all users knew that every dealer was going to allow just the same for that old truck he would trade without all this shopping around. It might slow up business just

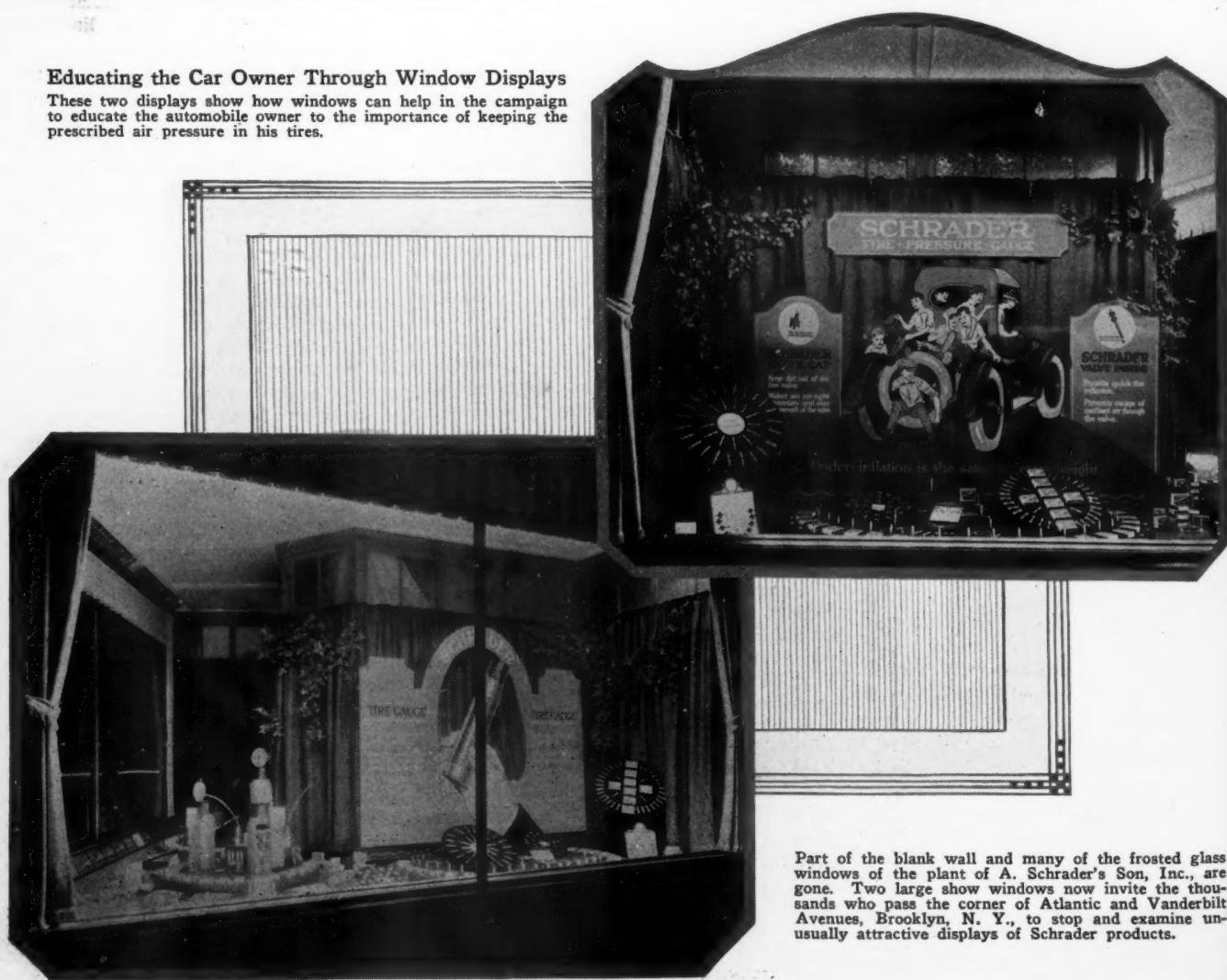
a little for a short time but the user would use the old truck until it was worn out and then trade it and the dealer would make money. I say that every truck manufacturer should join in this and be made to put up a bond to the appraisal company and to have a say in the appraisal value and if they did not stick up to the rules that the bond be forfeited and the appraisal concern refuse to appraise any trucks of this company and all their trucks would be refused a place in the appraisal book.—W. C. Wright, Ellwood City, Pa.

### Bus Traffic Growing in Indiana

Reports from Indiana state that the transportation of freight and passengers by buses owned and operated by traction companies is growing in popularity in that state. The Indianapolis & Cincinnati Traction Co., is now co-operating with a bus system between Brookville and Rushville, Ind. The Interstate Public Service Co., is also co-operating with an automobile route in the Madison territory, providing a through service. This bus system, however, is owned by the Interstate company. A similar policy is being followed by the Indianapolis & Eastern Traction Co.

#### Educating the Car Owner Through Window Displays

These two displays show how windows can help in the campaign to educate the automobile owner to the importance of keeping the prescribed air pressure in his tires.



Part of the blank wall and many of the frosted glass windows of the plant of A. Schrader's Son, Inc., are gone. Two large show windows now invite the thousands who pass the corner of Atlantic and Vanderbilt Avenues, Brooklyn, N. Y., to stop and examine unusually attractive displays of Schrader products.



# SERVICE AND REPAIR DEPARTMENTS



## Engineers and Service Managers Get Together at Service Convention

**Time Element in Service Can be Reduced if Engineers Will More Intimately Study the Service Managers' Problems. Factory Officials Are Beginning to Realize Value of Representation at These Meetings**

THE joint service meeting of the S. A. E. and the Service Division of the N. A. C. C. at the Engineers Club, Dayton, November 20-21 must have indicated to those present, the progress made in the development to "Reduce the Cost and Improve the Quality of Service." Up to the time of the Chicago meeting a year ago factory service managers and representatives of service associations, endeavored to solve service problems, and although progress was being made it was quite apparent that until the factory and engineer came into the picture the desired service could not be developed.

It was in Chicago that the first real step in co-ordinating with the engineer was made, and it was at this meeting that both the service manager of the factory and dealer as well, realized that all concerned must get together on a work-together-basis if the car and truck owner is to be rendered service at satisfactory costs. The engineer has his problems. So has the dealer. And the factory service manager being between both has many. The solution of the greater number of these problems is now made possible with these three factors being co-ordinated. That is why the Dayton meeting, where there was a real get-together spirit displayed, stands out prominently among all meetings.

The Service Committee of the N. A. C. C. is to be congratulated in its selection of speakers and subjects and the former complimented for their frankness in dealing with policies and problems in factory and service methods. The program was unusually well balanced. The attendance was large and for the first time the members remained throughout all the sessions which proves the advisability of the meeting place

being away from large manufacturing centers, and that the factory executives have waked up to the value received by their representatives attending.

It was the consensus of opinion at the close of the meetings that the paper and address by O. T. Kreusser, co-ordinating engineer, General Motors Research Corp., stood out by itself, although all papers were excellent. Mr. Kreusser's paper, which is printed elsewhere in this issue, showed a practical way for the engineer to compile service data on his design, and a large chart was exhibited and explained by Mr. Kreusser. The data submitted was based on actual experience.

Another high spot of the convention was the announcement of tentative plans of the Service Division to hold a gigantic national service congress in Detroit, next May. Everyone interested in service, including factory representatives,

dealers, distributors, independent service station men, garages, equipment manufacturers, service associations, etc., will be invited. In connection with this event it is proposed to hold an exhibition of service station equipment and tools. The plan met with unanimous support and if approved by the N. A. C. C. will be carried out.

The opening session got away to a good start after Charles H. Paul, chief engineer, Miami Conservancy District and president of the Dayton Engineers Club welcomed the delegates in a most cordial manner. Charles F. Kettering, vice-president, General Motors Corp., always an excellent and witty speaker, excelled himself in his address. He humorously analyzed service in the field from the owner's point of view and stressed the need of the service men locating the real trouble. He also pointed out what the engineer could do.

The paper on the "Evils of Headlight Dimming," by R. E. Carlson, mechanical engineer, Bureau of Standards, brought out many interesting facts. Mr. Carlson

stated that the reason so many poor headlights were in use, was due to the fact that the owner does not know what constitutes a good light and that the car maker is largely at fault. The speaker said, however, that the newer cars have better lights. Tests made by the bureau of 400 cars made by 56 companies showed that only 5.5 per cent had good lights, that 52.2 had dirty lenses, 4.3 broken, 3.8 loose and 35.8 per cent were twisted. Of reflector conditions, 38.8 per cent were dirty. Over 73 per cent had bulbs out of focus. There were only 54 per cent with glaring lights, 46.7 per cent not correctly tilted, 23.6 per cent not parallel and over 8 per cent were without outside adjustment means.

### Their Papers Attracted Very Favorable Comment



O. T. Kreusser  
Co-ordinating Engineer, General Motors Research Corporation



J. Willard Lord  
Service Manager, Harrods Motor Car Company

Don T. Hastings, Detroit, who has practiced and advocated flat rates for some time past, opened the afternoon session. His subject was, "What Lessons of Value to the Engineer Has the Flat-Rate System Developed." In his opening remarks he dwelt upon the factors of design, units, and their relation to price, assembly, production, etc. The speaker said the engineer had very little leeway in costs and that factor of service is but 10 per cent in production and engineering. The lessons taught by the flat rate have been known by the engineers for some time. Mr. Hastings then described certain designs which were the extreme insofar as accessibility and low labor repairs were concerned. He described the advantage of certain components being made oversize in service work. He also suggested that service data should be sent by the factory to all dealers instead of only to the distributor, stating that many times the factory knew of how a certain distributor handled certain service problems but this information was not passed along to all dealers as it should be.

#### Reduction of Costly Tools

In his paper entitled "What Part Can the Engineer Play in Reducing Repair Costs by Eliminating the Needs of Costly Tools," W. A. Francis, manager, Ford Motor Co., Cincinnati, said that simplicity of construction and standardization of design would bring this about. Yearly changes of design makes for incomplete service equipment and resultant costly repairs, he said, and places a burden on the dealer as well as the customer. The departure from the principal of standardized design increases the parts to be carried by the dealer to say nothing of delay and expense to the customer. "The industry, he said, "has added the words 'fictitious value' to automobile parlance because the customer is prone to ask for a higher appraisal on his car than the dealer can consider it is worth, because a matter of a year, sometimes a few months, has antiquated it from a resale value. An important part the engineer can play in reducing costs by eliminating the need of costly tools is along an accepted practical principle of standardization of design, with ardent devotion to it, in order to standardize all working parts. A good slogan is one I understand was recently adopted by the S. A. E. at

the Detroit section meeting, "Build Cars for Service—Not for Service Stations."

J. Willard Lord, service manager, Harrolds Motor Car Co., N. Y., and president of the Automotive Service Association of that city, discussed "How the Engineer Can Co-Operate to Make the Flat Rate More Successful." He said in part:

#### Service and Engineering Problem

"Service and maintenance, more definitely the actual performance of repairs, is a big engineering problem and one affected by design and production. I think it is a problem which, when the engineering is co-ordinated, starting with design, is bound to lead to a production of vehicles which will give greater satisfaction to the buying public than ever will be possible under the general conditions existing today, of largely disassociated engineering effort.

"I feel that meetings of this kind, bringing service men and engineers together, is a decided step in the right direction and I hope that the interest aroused by gatherings of this character will lead engineers so to organize and arrange their work that they can feel free to get away from the factories and into the field for real 'get acquainted' visits; so that they can actually see—first hand—what their product is doing in service; what its faults are and just how they develop; where changes in design would greatly improve accessibility, facilitate repairs and the use of standard tools, rather than shop made special affairs; invariably expensive and sometimes of doubtful value.

"Maintenance price competition is by no means something new. However, flat-rate charges make comparisons more easy than ever before. Therefore it is more important than ever from a viewpoint of cutting down sales resistance, that maintenance charges represent real value received and not include the cost of much inefficiency and excessive material charges.

"Shop standards and flat-rate charges are bringing to light and making us fully realize many valuable lessons and ways and means to reduce maintenance charges.

"I am quite certain that along with the adoption of flat-rate charges that more money than ever before is being invested in repair tools.

"When labor is sold by the hour there is

little incentive to develop or purchase tools because the tool cost increases the overhead and the whole advantage obtained immediately goes to the customer. Not so with the flat rate. Once the selling price is set, there is every incentive to invest in tools and other equipment which will cut the cost of the job. The savings effected not only take care of the increased overhead but go to make a real labor profit.

"It is almost needless to state that the degree of accessibility has much to do with the extent of labor charges for a given job irrespective of good tool development. If a vehicle must be partly dismantled to make some simple repair, it is going to take time to perform this labor.

"Another phase of accessibility concerns the ease and facility with which major and minor units may be removed and replaced. This applies more especially to trucks than to cars. Unit exchange greatly reduces the days per year a truck need be laid up for repairs. As truck operators learn more and more how to best use their equipment, they are operating their trucks a greater percentage of the time and charging to maintenance rental of trucks hired temporarily while their own vehicles are undergoing repairs.

"Greater accessibility and ease of removing and replacing units will do much to help cut down flat-rate charges.

#### Service Retains Business

"The argument has been advanced that it takes a factory inspection department to protect dealers from the unscrupulous parts manufacturers or from the parts manufacturers from whom the factory is buying. On the other hand if these people are looking for a greater outlet for their products they must give service to retain any new business they may secure. Furthermore, I think the average parts manufacturer has as much pride in the product he is producing as has the average automobile manufacturer.

"Direct selling of automobile parts would help to reduce the factory parts inventory. Let part manufacturers selling to factories, sell direct where quantity orders are of such size as to interest them. If factory tools are used in the production of such orders, pay the factory a royalty charge to cover such use.



**J. W. Tracy**

Vice-President and General Manager North East Electric Company

**Earl Turner**

Manager Automotive Electric Association

**E. J. Graef**

Delco Company Chairman Dayton Committee

**F. J. Wells**

Pierce-Arrow N. A. C. C. Service Committee

**P. T. Durham**

Secretary A. E. S. A.

**The Question of Parts Stock**

"We are told that the factory overhead is one of the principal reasons for the relatively high cost of certain parts when compared with outside prices. Whatever may be the reason, many repair parts which can be obtained far cheaper from parts manufacturers give such service as to compare favorable with the factory product. This being so, does not the production of parts and the pricing of them deserve your attention? If your production costs are all right, what about the distribution of the burden? If you have a heavy investment charge, would it not pay to adopt the selling methods of these parts makers and offer discounts for quantity purchase and time deliveries? This would allow you to reduce your inventory and would tend to spread it over the stocks of your distributors. I think it would lead to lower prices of parts most consumed which is the thing most needed.

"As it stands today, every distributor keeps his stock at the very minimum at which he can operate, sometimes below this figure and the manufacturer is obliged to keep up his stock for the whole country. Both distributor and factory are at a decided disadvantage because of this condition. The distributor is at a disadvantage carrying such a little stock. His customers encounter shortage much too often. Ordering small quantities frequently, receiving small quantities frequently and keeping the records involved, takes clerical help. The accumulated effect of these small orders and small shipments concentrates at the factory and must make parts department overhead much higher than if parts were ordered in large quantities. Clerical, stockroom and shipping charges are bound to be higher per unit. I believe that dealers would order in larger quantities if the proper incentive were provided.

"There is one other item which would help flat-rate service and give a customer the immediate answer as to cost. It is with regard to passing on parts within guarantee. This today, is usually a factory prerogative. However, the fact that one company has been able to make its service managers in several localities make the final decision on parts within guarantee, resulting in immediate answer as far as the customer is concerned, shows that

this scheme can be worked out much more generally than is the case today."

W. L. Wise, service manager, National Cash Register Co., presented a paper on "Selling Service," and among the high spots of his address were the following pertinent paragraphs:

"The company become just as big or just as little as the individual service man. He may understand thoroughly the ideals of the company, or he may be indifferent. The user receives the same impression of the company which the service man holds.

"The most important thing any business sells is its service. In the automobile industry you are selling so many miles of service and not an automobile. Easy riding, convenience, etc., are incidentals. The user is buying so many miles of service. He may not decide to take advantage of the full period of usefulness, but he does want to know that when he decides to trade or sell his car, it will have a certain number of service miles to run. These service miles establish its trade-in or sales value.

"Service means carrying out the terms we have made and the obligations we have taken upon ourselves in selling our product. The right to this service is included in the price of the article when it is sold.

"In the sale of service there are several important considerations, namely, the company must school its agents in its service policies; must establish its reputation with the service representatives; must try to sell its service and its servicemen's work to their users; the user must be taught his obligation to the mechanism he has bought; the service man must be able to sell his service to the user so that after the job is completed the bill is willingly paid and the user maintains a friendly disposition toward the company and retains a high regard for the mechanism he is using.

"Everyone dealing with service has had to deal with users who claim certain concessions had been offered at the time of the sale. There is but one way to cure this. Educate your agents on the provisions of your guarantee and see that they capable of selling both it and your service policies to their prospects. How much better it would be for the salesman

to speak enthusiastically of the quality of your service, instead of having him sidestep any reference to it, or if he does mention it, he misrepresents either by omission or commission."

One of the interesting papers of the final session was that presented by P. J. Durham, of New York, secretary of the A. E. S. A. and president of the P. J. Durham Co. It presented concisely the problems confronting the authorized electric service stations. Among other things stated by Mr. Durham was that it is the frequent repairs that are necessary while the car is comparatively new that most annoy the owner and worry the electrical service man. The speaker charged production costs with being responsible for these factors and emphasized the fact that owners are taking cognizance of material and workmanship as well as design, and that the expenditure of a few cents would save much of the grief.

**On Electrical Equipment**

Mr. Durham pointed out the difficulty experienced in making a correct diagnosis except with long experience and technical training and then proceeded to analyze the electrical equipment from a design, material and service standpoint. On some units, he said, the cost of repairs exceeded the car maker's cost of a new unit, and cited for an example the replacing of headlight bulbs. He also quoted a number of concrete cases where the cost of labor to the owner was prohibitive because the electrical component to be repaired required partial or complete dismantling of the other units. Tiny screws, inaccessible nuts and bolts also came in for criticism, as being responsible for labor charges out of proportion to the service operation. Wiring also came in for censure as well as special types of batteries which compelled the owner making a replacement to purchase a new container unless he bought the special battery. Battery terminals were also shown to be the cause of trouble and expense. Mr. Durham's paper was well received and pointed the way to better and cheaper service for the owner.

J. W. Tracy, vice-president and general manager, North East Electric Company, made a keen analysis of electrical service in his paper, "What Can the Engineer Do to Simplify the Repair," and this paper



**F. A. Bonham**  
Durant  
Chairman N. A. C. C.  
Service Committee

**Wm. Warner**  
Cadillac  
N. A. C. C. Service  
Committee

**Harry R. Cobleigh**  
Secretary Service Committee  
N. A. C. C.

**L. C. Voyles**  
Marmon  
N. A. C. C. Service  
Committee

**A. B. Cummer**  
Autocar  
N. A. C. C. Service  
Committee

was one of the highspots of the convention. After describing how the electric equipment was introduced as a refinement instead of being incorporated in design, Mr. Tracy said in part:

"The starting point for the engineer in simplifying repairs is in the selection and application of the apparatus. While it may be true that the choice of the engineer in selecting equipment may have no direct bearing on the ease or difficulty with which repairs are effected, there can be no doubt whatever but that the electrical service man's work is seriously complicated by unsatisfactory performance of inadequate apparatus. No repairman, however expert, can hope to satisfy an owner when the generator hasn't the output to meet the demand of the starting and lighting system, nor can he make a puny starting motor exert itself beyond its inherent capacity on a cold morning.

"The selection of proper equipment is not a difficult matter as data is available to the electrical, automobile and battery engineers. There is no need of guess work. The battery is of vital importance yet it is often dismissed with scant consideration. It should be selected with a view to the duty it is to perform rather than the space it is to occupy. The engineer can do a great deal for the service men by selecting equipment with a fair margin of safety for the emergency. The application of the equipment offers the greatest opportunity for the engineer in simplifying repairs and the one outstanding feature should be accessibility.

"One of the most difficult things the service man has to contend with is the maintenance of the repair parts in stock. On the 14,000,000 automobiles now in use there are over 1000 different types of electrical equipment. On a very large percentage of these cars there could be satisfactorily installed one of the four equipments recently standardized by the A. E. A. One electrical manufacturer has over 400 different armatures to service, all for machines in the field. The need here is obvious. Standardize to reduce the number of models and parts. Discourage unnecessary and minor changes in application and design, but where changes are necessary and desirable a decided effort should be made to use parts common to apparatus and already in use. Encourage development and research, but put new devices into service only when they represent and have proved to be a distinct and advance in the art.

"Satisfactory service is practically impossible when the car owner field is made the laboratory. No matter how skillful or ingenious the service man, the general result will not be satisfactory. There will be substitution of parts, usually of inferior quality because an economical genuine parts stock cannot be selected except through long experience. Replacement units for service are not practical for devices in the development stage. The service station shelves may be loaded with units, obsolete before they can be used.

"The question of technical information is also brought into this situation. A simple repair cannot be expected from the service man if he is confronted with a new and strange device. Time is lost in tracing out circuits, making and unmaking

connections, final tests are based upon incorrect assumptions and the repair, simple in itself, is thus confused and complicated. The introduction of new apparatus should be preceded or at least accompanied with full and explicit information for its service."

Among other papers presented was one dealing with the evils of crankcase dilution and how to educate the public by E. F. Hallock, Vacuum Oil Co. He submitted a number of figures to illustrate his points and discussed lubrication very thoroughly. He was followed by T. A. Waerner, engineer, Tide Water Oil Co. who described what the engineer could do to help the public thoroughly realize the

necessity for frequent crankcase draining.

The convention passed a vote of thanks to the local committee and committee on arrangements for their excellent service. The local committee was headed by E. J. Graef and comprised in addition Vincent G. Apple, E. H. Kramet, O. T. Kreusser, R. B. May and W. L. Wise. The S. A. E. meetings committee was as follows: M. P. Rumney, chairman; O. C. Berry, T. J. Little, Jr., Thomas Midgely, Jr., J. T. Milton, C. F. Scott and E. P. Warner. On Thursday the service men and engineers visited the National Cash Register plant, Delco factory, laboratory of the General Motors Research Corp., and McCook field.

## Providing the Engineer With Service Data to Improve Design\*

In the opening paragraphs of his paper Mr. Kreusser, stressed the importance of contact by the engineer or designer in the field, so as to provide a "definite channel to bring to the designing and production organization the information that should be most valuable in producing an improved product. In addition to this contact he should be provided with a prompt reliable means indicating just what is being done to the cars in all the fields that the service organization represents.

"The average Service Department of a car company can furnish a pretty complete list of the number of piece parts that go out to the different territories. But most times the knowledge unfortunately stops there. There is no complete knowledge as to just what attention is necessary to the cars in the field to provide performance that is satisfactory to the customer. This record of piece parts shipped in itself is of not much value to the engineer insomuch as it does not give definite facts as when the pieces are used, or whether all work done depended upon the factory as the source of supply for such parts needed. It leaves out the big factor of making repairs and adjustments that do not require new piece parts.

"The Service Department, with the contact it already has in its field, is in good position to make available to the engineering and production departments the exact information pertaining to the equipment in the field and from all points at all times.

"We can never hope to depend upon the field service stations to provide detailed records such as copies of every work order covering the work they do. This involves entirely too heavy a clerical expenditure both in the field and at the home office. Furthermore, it is very questionable whether that would be desirable excepting in individual instances like the placing of a new model or an

entire new design in the field. Then the detail should be carried on for a limited period only.

"The gradual expansion of the flat-rate system automatically cares for the cost and time analysis. What the engineer is particularly interested in is whether or not difficulty is experienced and how frequent with any particular component of his automobile. If valve trouble is experienced it is his job to determine whether it is quality of material, method of installation or shortcomings of design that is the real cause of the trouble, and not the function of the service manager's record to indicate this."

### Chart System Simplifies Comparison

"One of the activities of the General Motors Research Corp. is to carry on extensive car tests. We are primarily interested in finding the good points and shortcomings of different cars under operation conditions that are comparative. Our routine consists of obtaining a car, usually through regular commercial channels to insure that we get regular production product, built by General Motors Companies or cars produced by competitors, or others that may have interest in indicating new developments.

"These cars are run over roads that represent typical all around conditions of city and country driving. As far as possible they are operated twenty-four hours a day. They are inspected and adjusted periodically, and if necessary, given such overhauling as will keep them in satisfactory operating condition.

"Tests are conducted on the basis of 25,000 or 50,000 miles of service and a detailed record is kept of just what happens, just what is done and what is found from day to day.

"We have worked out many methods of putting the information so obtained so it can be readily analyzed, in connection with bringing out the advantages and shortcomings of design as proven by this service. To make this readily available to the engineer, we find a chart system

\*Extracts from paper read by O. T. Kreusser, of the General Motors Research Corp., before the Service Managers Convention at Dayton, Ohio.

permitting comparison of the details one car to another as being a most constructive and useful record.

It is this comparative record every service department should teach the service stations to keep, to provide that knowledge of what is going on and incidentally have it available through weekly returns to the service manager for many constructive purposes.

"Through the process of elimination we found that all references pertaining to the parts and functioning of a car can be included under about 125 headings.

A typical chart was shown at the meeting. The chart showed the analysis of the troubles that have been experienced on road tests with cars selling from \$300 to \$3000. Concerning this chart, Mr. Kreusser, said:

"The dots indicate in each instance that trouble was experienced with the item concerned. No effort is made to indicate whether or not the trouble is serious or costly to repair. The location of the dot indicates the mileage at which the trouble occurred. In our particular analysis at the Laboratory, we are interested in comparing a car with other cars

(Continued on page 74)

ENGINE	Cooling System:	Transmission Operation:	Braking:
Stationary Members:	General Operation Radiator Water Connection Fan Fan Belt Carbon Cleaned	Transmission Case Gears Shafts Bearings Control Mechanism	Adjustments Lining Operating Mechanism Operation
Moving Members:		Propeller Shaft:	Instruments:
Crankshaft Crankshaft Bearings Connecting Rods Connecting Rod Bearings Pistons and Rings Piston Pins and Bearings Camshaft and Bearings Gear Sprockets and Chains Flywheel		Shaft Universal Joints	Oil Indicator and Gages Ammeter Gasoline Gage Engine Temperature Indicator Speedometer
Lubricating System:		Rear Axle Operation:	
Lubrication Supply Oil Pump Oil Leads — Troughs and Pockets Oil Scoops and Dippers Oil Leaks Oil-Gauging Devices		Differential Case Gears Shafts Bearings Housing	
Valves:		Wheel Attachmer. Wheel Bearing Torque Member	
Inlet Valves Exhaust Valves Valve Lifters, Rockers Push Rods Valve Guides Valve Springs and Retainers Valve Adjustments Valve Grinding			BODY
Induction and Exhaust System:			Body:
Fuel Tank Fuel Lines Vacuum Tank Carburetor Intake Manifold Exhaust Manifold Exhaust Pipe and Muffler Gaskets			Frame Covering Supports Finish Upholstery Hardware Windshield Instrument Board Running Boards and Floor Boards
CLUTCH AND TRANSMISSION			Top:
Clutch:	Lighting and Signaling: Bulbs Fuses Switches Horn	RUNNING GEAR	Frame Covering Curtains
Friction Mechanism Control Mechanism Bearings	Wiring: Low Voltage Wiring High Tension Wiring	Running Gear: Front Axle Steering Spindles Wheel Spindles Front Wheel Bearings Wheels and Rims	
		Frame: Breakage Rigidity Brackets, Hangers and Cross Members Rivets and Bolts	
		Springs: Leaves Shackle, Bolt and Clip Adjustments Shackle Bolt and Clip Replacements	
		Steering: Adjustments Steering Gear Drag Link and Tie Rod Operation	
			Metal: Hood Radiator Shell Fenders Splash Aprons Supports and Fastenings Lamps

These are the 125 headings which are included in the chart below.

CAR	ENGINE	ELECTRICAL	CLUTCH & TRANS.	RUNNING GEAR	BODY																		
NO.	STATIONARY MEMBERS	Moving Members	LUBRICATING SYSTEM	VALVES	INDUCTION AND EXHAUST SYSTEM	CYLINDERS	COOLING SYSTEM	WIRING	IGNITION	LIGHTING & SIGNALING	CLUTCH	TRANSMISSION	PROPSHEET	FRONT AXLE OPERATION	RUNNING GEAR	TRAILER	SPRINGS	STEERING	BRAKING	INSTRUMENTS	BODY	TOP	METAL
4																							
37																							
63																							
64																							
27																							
28																							
38																							
62																							
100																							
109																							
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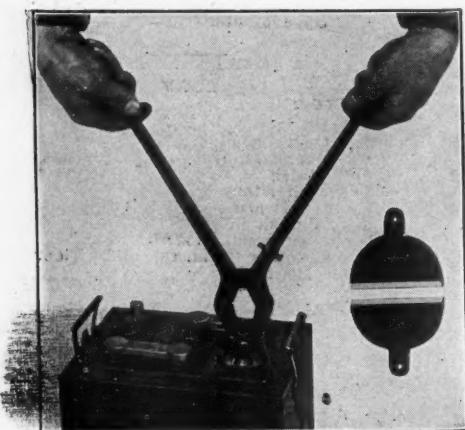
The Dots Under the Various Columns Indicate the Frequency of Trouble. The Original Chart, Used by Mr. Kreusser, is Fifteen Feet in Length

# Service Station and Repair Shop Appliances

## The Reliable Battery Post Cutter

Among the many appliances put out by the Reliable Parts & Mfg. Co., Cleveland, Ohio for the battery service station, the Reliable Battery Post Cutter is one of the latest.

The construction of this cutter is such that an enormous working leverage is provided. This construction greatly sim-



Cutting a Battery Post

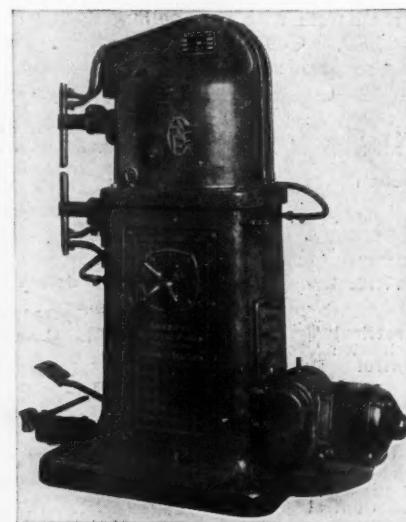
plifies the work of cutting battery posts. In operation it will be found to cut a straight edge and will shave or trim any post flush with hood plate. The tool is constructed of malleable iron and the knives, which are interchangeable are of tool steel, drop forged. The entire assembly is rugged and strong.

## Automatically Controlled Spot Welding Machine

A spot welding machine with an automatic control that makes possible a very high speed of operation is being manufactured by the American Electric Fusion Corp., Chicago. Its range of application includes practically all production welding operations from the welding of fine wire to the joining of comparatively heavy sheet steel.

With the automatic control of the American welder, the current is turned on and off, and the pressure applied, by the controlling mechanism. The current is applied to a certain definite spot only and in just the quantity and for the length of time necessary.

The welder is driven by a Westinghouse type A. R. S. repulsion-induction type motor operating at a speed of approximately 1100 r. p. m. Mounted on the motor shaft is a quadruple thread worm, meshed with a worm gear, giving a primary reduction between the motor and the lower drive shaft of the gear housing of 1 to 10, which, with equal gears, drives the welder at the rate of 110 spots a minute. Two other gears of the lathe



Automatic Spot Welding Machine

change type are provided, which allow a minimum speed of 80 spots and a maximum speed of 140 spots a minute. Any other combination of gears to suit the work in hand can be used. By substituting a double or a single thread worm and gear in place of the quadruple, a further reduction can be procured down to 13 spots a minute.

A foot treadle control is used for starting and stopping the welder. This treadle, which, for convenience, is mounted in front of the machine, is so designed that the operator can obtain one or a series of spots, depending on the kind of work. When the control is fully engaged, continuous operation is obtained.

## Kess Valve Grinder

The Kess valve grinder offered to the trade by the Kess Valve Co., 809 Harrison Building, Philadelphia, Pa., is stated to reduce considerably the time ordinarily required in valve grinding.

This grinder is less than one-half pound in weight which fact is instrumental in lessening operating fatigue. It works at drill-chuck speed in any high-speed drill, making a complete oscillation forward and backward for each revolution of the drill. The rapid reciprocating motion is obtained by a simple compact mechanism. Price, \$5.



Kess Valve Grinder

## Wallace Bench Solder Pot

The latest addition to the line of labor saving devices manufactured by J. D. Wallace & Co., 1401 Jackson Blvd., Chicago, is an electric solder pot with an automatic heat control. This pot is claimed to simplify the problem of heating metals of slow heat conductivity, such as babbitt, etc. Oxidization with its harmful characteristics is overcome by the de-



Solder Pot With Thermostatic Control

sign of this solder pot. An automatic control functions when the material heated reaches 600 degrees F. This control maintains the temperature of the contents of the pot and prevents over and under-heating.

The pot will accommodate 15 lb. of solder which amount it will heat to 600 degrees, in 20 to 25 minutes. This quick action is due to the fact that a high wattage heating element is provided around the entire container, sides and bottom.

The pot weighs only 13 lb. and can be easily carried anywhere and operates on either 110 or 220 volt A.C. or D.C.

## Lupton's Stock Room System

The accompanying illustration gives a very good idea as to the auto parts storage systems being built to specification by David Lupton's Sons Co., Allegheny Ave. and Tulip Sts., Philadelphia, Pa.

Service, after all, can only be provided where system exists. Without a complete assortment of demand parts, there can be no such a thing as service in the modern sense. The owner wants and demands quick repairs. He demands reasonable charges, fixed before the work is done. He demands delivery when promised and a good workmanlike job. He is entitled to all these things. One way of providing it is to have a thoroughly efficient organization and systematically ranged stockroom.

The illustration depicts a 3-unit system. It was built particularly for Maxwell parts and carries a stock suitable for a dealer servicing up to a hundred cars.

The related parts of each unit assembly are together. Parts are found where they belong regardless of size or shape. A bin is provided for the proper quantity

his machine, the Dollin Die-Casting Machine is the first modern high producing unit of its kind ever placed on the market. This machine was developed by Mr. Dollin, who has had many years experience with the leading companies in the die-casting field, during the last five years. The availability of this machine makes it possible for the automotive manufacturer to produce his die-castings.

The Dollin machine is capable of running well over 200 operations an hour and can be operated by practically any intelligent workmen as it is fool-proof and safe. One of its features is the fact that it is interchangeable as to alloys. Heavy manual labor is also eliminated as the machine opens and closes the dies and shoots the metal entirely by power. Power is also supplied for pulling cores and slides.

The method of heat regulation is stated to be absolutely reliable, and the manner of handling the alloy such that deterioration by heat and absorption of

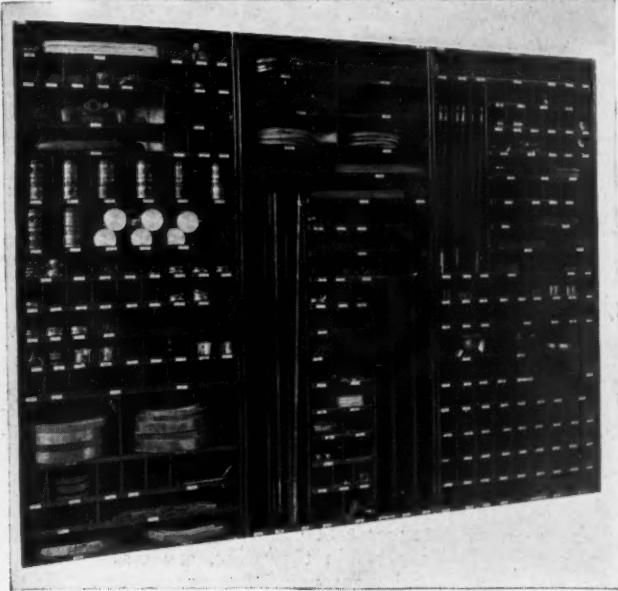
iron is reduced to a minimum. A special method of using compressed air is employed.

### Ingersoll-Rand Air Hoist

The Ingersoll-Rand Co., 11 Broadway, New York is offering a new style size A, 500 capacity air hoist. This hoist is of a smaller and more compact construction than the average but is admirably suited for wide range of service where rapid and economical lifting and handling of small

loads, too heavy for one man to deal with, is desired.

An automatic brake holds a load under all circumstances and a graduated throttle permits close regulation. The hoist's

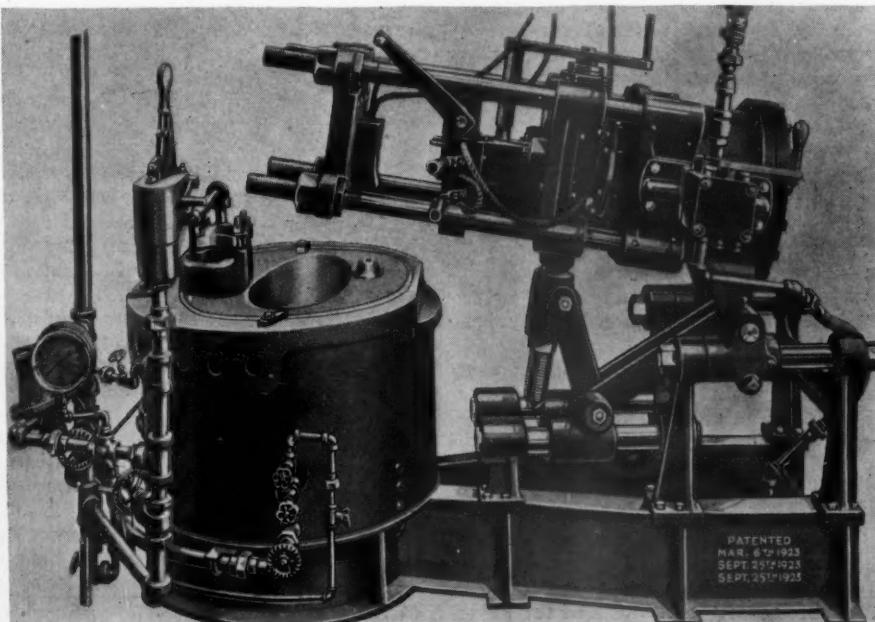


Lupton Cabinet for Stock Room

of each part, large or small, according to the average demand. The part number is on each bin. Surplus bins are provided at the end of each assembly, in which additional parts—not specified on the bin—may be carried if local requirements make that necessary.

### Dollin Die-Casting Machine

Of particular interest is the announcement of Edgar N. Dollin, 6 Church St., New York City, in which he states that



Large Production Die-Casting Machine



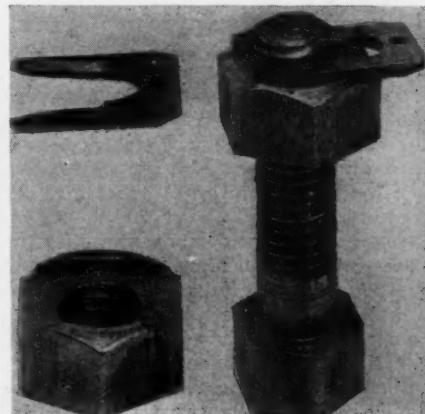
Ingersoll-Rand Air Hoist

balanced 3-cylinder air motor operates in either direction with a noticeable absence of vibration. The motor operates in a bath of oil and the gears turn in a heavy grease. Oil passages lead to the bearings.

### R-A Safety Lock Nut

The Rose-Albin lock nut, made and marketed by the Specialty Mfg. and Sales Co., 173 Lexington Ave., Brooklyn when screwed into place on any bolt cannot be removed without destroying the threads on the bolt, unless the locking device is removed first.

The locking feature consists of a two-legged pin which slides into a groove cut into the head of the nut. The inner sides of the legs are beveled to register with the pitch of the thread. This pin locks the nut thoroughly and must be removed before the nut can be unscrewed.



Showing How the R-A Safety Lock Nut is Employed

# What Good Roads Are Doing for the Farmer!

## Conditions Aiding Agriculture Aids All Industries. The Farm and Highway Transport Are Closely Bound Together

**F**ACTS proving that every community which has shown an increase in motor car sales has also shown an increase in productiveness were cited by Thomas O'Brien, assistant sales manager of the Olds Motor Works, Lansing, Mich., during a speech before the joint session of the north central division of the National Traffic Association and the Michigan State Good Roads Association. The following is a summary of some very pertinent angles dwelt upon in Mr. O'Brien's talk on "The Value of Highway Transport to the Farmer."

The desires and needs of a successful farmer can be reduced to four requirements; they were:

1. The ability to make a comfortable living from the land.
2. To rear a family carefully and well.
3. To be of good service to the community.
4. To leave the farm more productive than when he took it.

"Good highways greatly widen the farmer's area of distribution. They enable him to go to points where better prices are obtained, and with motor transport he can do this with a great saving of time, and time means money in handling farm products.

"A farmer must be able to move his products rapidly when the demand is active, especially if perishable, and thus the element of transportation is of vital importance to the modern farmer.

"The motor car and motor truck have greatly added to the farmer's ability to increase his business, and every community that has shown an increase of car and truck sales will show an increase in productiveness.

"The modern farmer must be efficient. There is no favorable outlook for the inefficient in any line of business.

"Lower cost of production and of marketing will be worked out by the man who uses modern scientific and practical methods, who mixes brain with his brawn, who knows where his production can be distributed to his best advantage, and who is situated so he has the ability to make use of good highway transportation. On a good highway his cost of delivery is lessened and his profits therefore increased.

"Good motor transportation enables the farmer to create variation in his crops and to produce more of the perishable crops such as fruit, etc., that return quick profits. This might be compared to the speeding up of the turnover in industrial and mercantile establishments with resulting benefit.

"The motor car and good roads have put the city and country closer together. They have helped much in developing the

co-operative plan of marketing which has enabled the farmer to increase his income by getting a better price for his products.

"Motor transportation has undoubtedly been the greatest single factor in aiding the farmer to fulfill the second requisite. His children now have the same educational advantages as their city cousins through the medium of the consolidated school and community high school, all now within easy driving distance of their homes.

"Entertainment for the whole family is no longer a farm problem, for the small town theatre, brought close at hand by the motor car, exhibits the same program of educational and entertaining motion pictures shown in the city. Should illness befall members of the family, they are no longer isolated from aid but can depend on the quick service of a neighboring physician who will arrive by motor car.

"Living on a good highway with quick transportation at his command, the farm-

er has become an important political factor in the life of his community. Now he meets with neighboring villagers and farmers in town and district meetings and voices his opinions on affairs of importance to himself and others. Thus the farmer is greatly aided in fulfilling the third requirement.

"The fourth point, is easier met since the farmer has had at his command the motor car.

"Now he reaches better and more diversified markets and is consequently better able to rotate his crops, thus enrichening the soil he works. Motor transportation makes easy the hauling of artificial fertilizers of the proper composition.

"The automobile has so shortened distances that county and state agents, both experts in their line, can visit him often and recommend the proper crops for his soil."

## Providing the Engineer With Service Data to Improve Design

(Continued from page 71)

of either the same price, class, or a different class.

"Then density of dots under particular headings automatically brings out that point. The chart does not indicate the particular nature of the trouble any more than the red signal advises the railroad engineer of what is happening in the block ahead, but it does indicate that there is need of attention and investigation.

"Bear in mind in this particular case, we are comparing cars that vary in price classifications ten-fold, but the real picture it brings out is of interest.

"From a customer's standpoint, a broken gas line, or a burnt out headlight bulb, while not a major defect, necessitates inconvenience and delay and adds or detracts from the confidence he may have in the product.

"The interesting thing that this chart brings out is that the troubles we expect in motor cars and the improvements the engineer contemplates making, do not always conform with the items that are causing the customer most trouble in the field.

"In the early day of the industry the engine was the source of lots of difficulty in the field. This chart, indicating a cross section of the products of the industry, shows that the power plant, on regular commercial products, is compara-

tively free of repeated troubles. The same condition is not at all true for such items that make up the motor car which are considered incidentals by the engineer and by productions; such as, wiring, fuel and oil lines, headlight connections and bulbs, cooling systems, brakes and sheet metal work. These all warrant considerably more attention than one would think necessary.

"We do not feel that there would be anything gained by attempting to make a specific analysis of cost of repairs in a record of this sort. We are interested only in indicating the comparative satisfaction to the customer of one car as compared with another. By keeping this point clearly in mind, it washes out all the confusion of trying to classify the nature of the trouble that would otherwise enter into a record, because after all, the fact that one has excessive trouble is in itself sufficiently serious to warrant a specific detailed investigation of that component.

"The number of engineering department investigations that might be warranted immediately narrows down to an easy determination of the most serious troubles being investigated first. The value of this particular kind of record is that it pertinently points out shortcomings in one's product that oftentimes are overlooked simply because it is thought they are of such minor importance that no investigation is necessary. This is very apparent by studying the locations of the dots on this chart.

"It is felt that a chart of this sort on a small scale designed to cover your

# BUILT OF ROLLED STEEL



## A Wheel that stands every test

**N**O truck wheel ever had to pass tests more severe than those to which the Bethlehem Wheel was subjected.

First, searching laboratory tests, conducted both by truck builders and by ourselves, proved the ability of the Bethlehem Wheel to stand up under the most severe punishment that a wheel could receive.

Then—the results of these laboratory tests were confirmed, over and over again, by road tests, demonstrating finally and beyond question the

capability and stamina of the Bethlehem Wheel.

And, finally—it is the ruggedness and stamina of the Bethlehem Wheel, as established by these tests, that explain the success with which it is meeting the test of hard, everyday service.

**BETHLEHEM STEEL COMPANY  
BETHLEHEM, PA.**

Sales Offices in New York, Boston, Philadelphia, Washington, Pittsburgh, Detroit, St. Louis, Baltimore, Atlanta, Cincinnati, Cleveland, Buffalo, Chicago and San Francisco.

# BETHLEHEM ROLLED STEEL TRUCK WHEELS

particular production can profitably be gotten out by each of the companies so that every authorized service station can from day to day place a dot upon each of the items against particular models showing what work had been done that day—in return for the help given by the service manager the service station gives him a carbon copy of their chart weekly.

"These charts are thus made available from all sections of the country and are replotted into a single chart and forms a not invaluable record to the service department to call the attention of their respective organizations to the seriousness of particular troubles or call attention to the freedom of a trouble that was once serious. It also permits an immediate check of what is happening relative to a particular detail in all sections of the country and permits one to weigh out what investigation is necessary to correct or eliminate the difficulty.

"The relative advantage of plotting a record of this sort by dots in place of actual figures is that one does not have to mentally carry a lot of totals to analyze the seriousness of trouble in operation.

"To identify closed from open cars on the master chart different colors or different shapes of dots or a combination of the two can be used. In the event that a dot for a single trouble gives congestion on the chart it is suggested that a dot represent five troubles, the first trouble being represented by an open circle; second, by one-fourth of it being blackened and so on until five troubles blackens the entire circle, forming a dot. If desirable, colored tacks or glass headed pins can be used for the same purposes. Ink dots are just about as convenient as tacks and make a permanent record, which is recommended.

"The value of this record is governed entirely by the co-operation one can get from the various service stations, which after all becomes a problem to be worked out independently for each organization. Just how this is approached is governed by past experience with the folks that represent you in the field."

## What the Truck Dealer Should Know About Asphalt Roads

(Continued from page 27)

Compressed asphaltic paving mixtures develop very decided slab strength as measured by their resistance to impact. In a composite slab the asphaltic wearing of course greatly increases the resistance of the structure to impact. These facts help to explain why relatively thin asphaltic concrete pavements have successfully withstood heavy motor truck traffic.

### Big Savings in Resurfacing

Finding that old pavements of other types can be utilized as bases for new streets at a great saving in the cost of construction, highway engineers in many localities are adopting the policy of salvaging old pavements by surfacing with asphaltic concrete or sheet asphalt. This, in many instances, has made an excellent pavement for heavy truck traffic. Two

years ago, for instance, a contract was let in Oil City, Pa., for resurfacing a number of old brick streets with sheet asphalt and results have been very satisfactory. With one exception the brick pavements had been laid on a gravel base. In all cases the surface was very irregular and contained many pot holes. All the low places were filled with a dense asphaltic concrete which was found superior for this purpose to the ordinary binder mixture. A binder course one inch thick was laid over the entire pavement but it differed from the ordinary binder since it contained about 20 per cent of limestone screenings. The asphalt surface course, next applied was one and one-half inches thick. The addition of the limestone screenings to the binder proved very effective, since it formed an asphaltic concrete of great density and stability. After two years of hard usage the rejuvenated pavement has suffered no distortion even from five ton trucks.

About two years ago the National Paving Brick Manufacturers' Association after careful research and study in the light of modern highway development and the ever increasing truck traffic, adopted specifications for brick pavements which provide by preference for asphalt filler between the bricks. Today highway engineers the country over are manifesting their endorsement of the association's action and are adopting this flexible waterproof, frostproof filler everywhere brick pavements are laid, since it allows the pavement to expand and contract with weather changes and permits the absorption of traffic impact.

Many tests have been conducted to determine the effect of the different types of modern road pavements on motor car and truck depreciation, gasoline consumption and tire wear but none has proven more conclusive than that conducted recently in the state of Washington, Oregon and California, by A. B. Cutter, city engineer of Everett, Wash., which demonstrated that on modern concrete and asphalt roads there is no difference in gasoline consumption. On gravel or waterbound macadam roads in good condition, however, gasoline consumption is from ten to thirty-five per cent greater. On gravel or waterbound roads in bad condition gasoline consumption is much heavier than thirty-five per cent.

### Savings Incident to Smooth Surfaced Road

Mr. Cutter's findings show that upon a smooth surfaced, resilient road, such as asphalt, the consumption of gasoline by 730,000 vehicles per year, is 38,400 gallons per mile of road per annum. At 24 cents per gallon this represents an investment of \$9,216. The consumption of gasoline by 730,000 vehicles on gravel or waterbound macadam roads was 52,000 gallons per mile of road per annum. This represents an investment of \$12,480. The paved road, therefore, affords an annual saving of 13,600 gallons of gasoline per mile of road or \$3,264 in cash.

The saving in wear and tear on tires and car parts is believed by Mr. Cutter to be fully as great as that in the consumption of gasoline. "Add to this," says Mr. Cutter, "the savings in road maintenance

cost—to say nothing of wear and tear on nerves of road users—and we have an object lesson in the economy of high type roads and of keeping roads in good repair for economic use."

While the superiority over all types of smooth asphalt roads in saving tire wear has been amply demonstrated by tests, the saving sometimes being as great as 4600 miles per tire, there is another aspect of the subject, which merits more attention than has been accorded it and that is the protection which the asphalt highway affords against punctures. A great many accidents are due to blowouts or punctures on gravel or waterbound macadam roads when the car or truck is traveling at high speed. Almost any car becomes uncontrollable under such circumstances. It is seldom, however, that punctures occur on asphalt pavements. Such road surfaces are washed clean by the rains or blown clean by the winds or the air currents that are occasioned by traffic. As a rule anything lying on the surface is easily discernable and avoided. On gravel or macadam roads, glass, bolts, nails, screws or sharp rocks cannot be so readily seen. Conclusive tests and experience are leading to the conclusion rapidly everywhere in America that asphalt roads soon pay for themselves. The good roads movement in this day does not mean so much the effort to get funds for highway improvement as it does an effort to see that the funds already available are wisely and economically expended.

Asphalt often is used as a joint filler for stone block and cement concrete pavements. And when such pavements have become so worn as to be unserviceable, asphalt construction in many instances has been used to resurface them as in the case of brick. They then become asphalt pavements with the old type of construction serving as the foundation. Asphalt is also largely used in a number of patented pavements because of its waterproofing, binding and long wearing qualities.

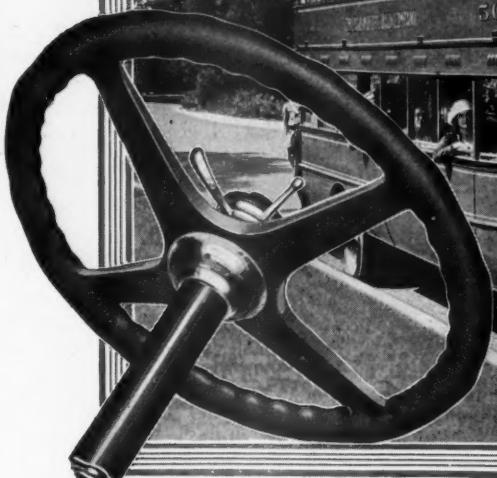
Asphalt pavements are, for the most part, known as "hot mix types" among highway engineers. The "hot mix" types are generally heated and made up at a central mixing plant, delivered to the road and laid while hot. This necessitates the use of motor trucks and since truck transportation, therefore, plays a most important part in asphalt construction and maintenance the asphalt paving industry opens a great market for truck sales that is expanding almost daily.

## Department Store Solves Parking Problem

A new way of relieving traffic congestion in downtown districts is being undertaken by Woodward & Lathrop, a Washington, D. C. department store.

Free bus service is provided for patrons who cannot leave their own cars near the store because of the parking regulations. A 25-passenger bus travels continuously from 9:15 a. m. to 6:00 p. m. over a route covering sections of the city where unlimited parking is permitted. The route and eight regular stops have been widely advertised in Washington newspapers.

**ROSS**  
  
**CAM & LEVER**  
 Steering Gears  
 for  
 Passenger Cars  
 Motor Buses  
 Motor Trucks  
 Fire Trucks  
 and  
 Tractors



### Chicago Motor Coach



## Giant Bus, Heavily Loaded, Steers Like Touring Car



### Investigate!

Ross Steering Gears have been used for many years as standard equipment on the familiar motor buses of Michigan Boulevard and Sheridan Road. For superior steering service investigate the new Ross Cam and Lever Steering Gear. Full information on request. Write us today.

EASY steering and positive control, with resulting safety of passengers, is assured in the buses of the Yellow Coach Manufacturing Co., Chicago. Equipped with the Ross Cam and Lever Steering Gear, these Yellow Coaches, with full load, are "as easy to steer as the finest touring car", says Mr. George A. Green, Vice President. And he adds, "There is complete absence of road shock at the steering wheel."

### Long Leverage—Variable Pitch

The long lever arm inside the new Ross Gear is the source of the enormous power which makes steering so easy and reduces unit pressures to a point where wear is negligible. In turning, the variable pitch of the cam produces a unique accelerated action at either extreme, which makes it easier to turn corners. And the Ross Cam and Lever Gear is so irreversible that practically all road shock is eliminated. Compact and simple in construction, the Ross Cam and Lever Steering Gear offers vital advantages in ease of steering, positive control, reliability, safety and service to motor bus manufacturers and truck makers.

ROSS GEAR & TOOL COMPANY • 760 Heath St. • LAFAYETTE, IND.

**ROSS**  
**CAM and LEVER STEERING GEARS**

EASIER STEERING - LESS ROAD SHOCK

## Activities of the Motor Truck Association of Philadelphia

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President  
**W. H. METCALF, Sec'y**  
Broad and Callowhill Streets

**W. A. MANWARING**  
Vice President  
**W. ROSS WALTON**  
Treasurer



### BOARD OF GOVERNORS

**F. A. WARNER**  
**H. M. COLE**

**THOMAS K. QUIRK**  
**D. H. ZIMMERMAN**

THE COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

THAT motor truck transportation was one of the crying needs in the reconstruction of earthquake-shattered Japan was the view expressed at the monthly meeting of the Motor Truck Association of Philadelphia, by Stanley E. Stady, formerly advertising manager for the International Harvester Company in Philadelphia and until September 1st, advertising manager of the Japan Advertiser at Tokio, in a most interesting illustrated talk before the association.

In his talk he stated that there were in 1922 only 12,000 motor cars, passenger and truck, of which 3,000 were trucks, throughout Japan. There were about 2,000 motor cycles, and over 2,000,000 bicycles.

One drawback to the motor car business in that country, he stated, was the high cost of machines by the time they arrive in that country, as the price is about doubled over the factory f. o. b. price in this country. He also said the local taxes there for motor car operation are excessive, being about \$200 per year for a car in the \$500 class.

The meeting of the association was one of the most important in several years, as the Board of Directors submitted a

report on the drastic revision of the by-laws and rules, opening up active membership to operators, manufacturers and merchandisers of motor trucks, tractors, trailers or accessories of the same or to anyone related to their organizations, the membership being divided into four classes, as follows: Division 1, including motor truck, trailer and tractor owners, hauling their own merchandise; Division 2, owners of trucks, tractors and trailers, operating for hire; Division 3, motor truck, trailer and tractor manufacturers, distributors and dealers; Division 4, road builders, manufacturers of road material and machinery, commercial body builders, and dealers, tire manufacturers distributors and dealers, motor fuel manufacturers and dealers, accessory manufacturers, distributors and dealers, and any firm manufacturing or merchandising accessories suitable for commercial transportation.

It was explained that the Board of Directors felt that the association should operate in a wider field than it had heretofore, for the benefit of all parties concerned, especially in securing united action in constructing state legislation or in the prevention of the adoption of injurious legislation.

The four divisions were invited to report on their election of two representatives each to the Board of Directors which resulted as follows: 1st division, Frank A. Wells, for two years; A. D. Aldridge, for one year; H. C. Fiechter, alternate; 2nd division, J. G. Whinney, two years; Edward C. Bird, for one year; B. G. Miller, alternate; 3rd division, F. H. Williams, for two years; W. A. Manwaring for one year, and J. C. Schwartz, alternate; 4th division, Thomas K. Quirk, for two years; W. Ross Walton, for one year; Frank P. Gaul, alternate.

Nominations for president to be voted on at the December meeting resulted in the unanimous naming of Frederick H. Williams, the present incumbent, against his plea for other nominations.

A strong appeal for the association's support of the Sesqui-Centennial was made by Ernest T. Trigg, president of the Sesqui-Centennial Association, and ex-president of the Philadelphia Chamber of Commerce in an address on "Bigger, Better and Greater Philadelphia."

An expression from the association of their attitude for the proposed plans was shown by a rising vote of unanimity.

### Don't Conceal Your Assets; Display Them!

(Continued from page 31)

steel tank; dump and coal bodies. A large Fordson drawn trailer and an Olsen lengthened wheelbase job were also exhibited.

Local newspaper advertising and a direct mail campaign announced the coming and object of the display. All were invited to attend at their convenience. The appeal of a large variety of modern and money saving equipment was brought saliently out in the copy. The dealer's salesmen valuing the combined psychology of the show and the sumptuously laid-out display room, took advantage of the exhibit and whenever possible induced prospects to stop around and view it.

Of course, there is no way of arriving at an actual count of sales directly attributable to the show, but the Martindale personnel claim that sales were boosted considerably during the two-week display period. Besides, the prospect file was increased with much live material from which many future sales are expected.

Those who visited the Martindale building, left with the feeling that when they were in the market for motor truck and body equipment they would patronize this establishment. They saw that matters were executed in a business like manner.

They also had an opportunity of seeing the systematically operated stockroom and the well ordered accessory department.

There is every reason why dealers throughout the country should not have as good displays as this. Surely if it paid this dealer in Philadelphia it will pay dealers in San Francisco, New Orleans or Chicago as well.

Don't conceal your assets—display them.

### G. M. C. Forms Managers' Securities Company

Formation of a new Managers' Securities Co., by the General Motors Corp. has been approved by the stockholders. Under this plan the occupants of the seventy managerial positions in the General Motors organization will be given an opportunity to become stockholders in the company.



Gramm-Bernstein New 14-Passenger Sedan Type Motor Coach

It will operate at any speed up to 45 m. p. h. and has an average fuel consumption of 15 miles per gallon. The coach is mounted on a Model 10 chassis. The body has four compartments, the seats are arranged crosswise and a door is provided at the left of the driver. Three doors are also provided on the right side with passenger aisle in the rear compartment where folding seats are provided.

# ACME



*On the radiator of every Acme is this Seal of Dependable Service.*

*Trade - Mark registered U. S. and other countries*

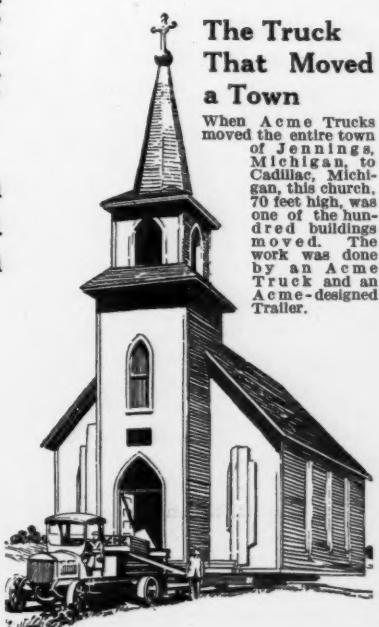
## *"This is My Idea of a Real Sales Franchise"*

Mr. C. P. Mager, Acme dealer at Mt. Vernon, N. Y., also says: "Since selling Acmes my profits increased steadily. This goes to show Acme has gained, from long, honest, dependable service, a reputation of being all expected of a truck. Due to Acme construction and exceptionally low operating costs, competition is reduced to a minimum."

Acme dealers know through experience the Acme Franchise is one of the greatest money-making opportunities in the automotive field. They know this Specialized Truck of Proved Units and Proved Construction is an easy, steady, repeated seller. And to make sales easier—the Acme Franchise provides for full co-operation between the factory and the dealer—co-operation in finding prospects, closing them and after-sale service. A co-operation which gives the Acme dealer dominating prestige, big profits and sound, healthy business growth.

Write today about this new Acme Franchise. Learn about its many money-making opportunities. Get the full details now. Your territory will not remain open long.

*With the Acme you have a truck for every need. Ten models—speed truck to one of 12,500 pounds capacity.*



### The Truck That Moved a Town

When Acme Trucks moved the entire town of Jernings, Michigan to Cadillac, Michigan, this church, 70 feet high, was one of the hundred buildings moved. The work was done by an Acme Truck and an Acme-designed Trailer.

**Acme Motor Truck Company**  
538 Mitchell Street      Cadillac, Michigan